ELECTRICAL SOUTH

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DECEMBER, 1956

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Kuhlman Southern Sales Manager

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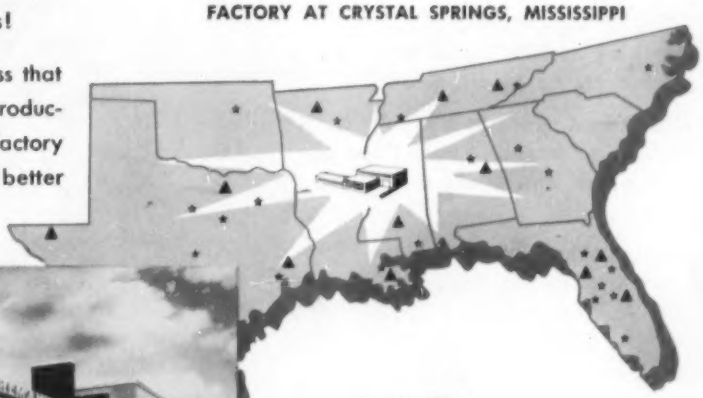

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Volume 36 **Number 12**

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ELECTRICAL SOUTH

SERVING THE 18 SOUTHERN AND SOUTHWESTERN STATES

December, 1956 — **Vol. 36—No. 12**

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ANNUAL SUBSCRIPTION—$1.50

FOREIGN—$10.00

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806 Peachtree Street, N. E.
Atlanta 8, Georgia

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Published Monthly by

W. R. C. SMITH PUBLISHING COMPANY

Dalton and Atlanta, Ga.

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Economic comment

by J. Whitney Bunting, Ph.D.
Contributing Economics Editor

Election and stability

The results of the 1956 presidential election have signified rather dramatically public confidence, not only in the abilities and leadership of President Eisenhower, but also in the relative prosperity of the national economic system. The fact that all efforts to portray the present economy as tottering on the brink of depression failed shows clearly that the general public has a firm belief in the continued prosperous condition of the country.

This confidence, in and of itself, will do much to strengthen the force of the statements of business leaders who have been foreseeing the next few years with rose-tinted glasses.

The campaign was a most difficult one for Adlai Stevenson, for all indications of the economy clearly illustrated the strength of the business picture. Certainly wages are at an all-time high and unemployment at an all-time low. Other indicators, such as productivity, national income, ratio of prices to wages, and many others, made depression type claims a miserable failure.

Just to illustrate this situation more clearly, some of the more important business indices show the following percentage gains for 1956 over 1955 (as stated by the Department of Commerce and the Bureau of Labor Statistics): personal income, up 7 per cent; gross national product, up 4 per cent; personal savings, up 14.5 per cent; consumer prices, up 2 per cent; government expenditures, up 4 per cent; and business expenditures for new plant and equipment, up 20 per cent.

In addition to these very favorable reports, there is also the welcome news that the Federal budget will show a surplus again. This is occasioned by the fact that tax collections are considerably higher than previously estimated, thus strengthening the fiscal position of the Government itself.

The only limits to corporate expansion under these conditions are those imposed by the inelasticity of the factors of production—labor, capital, and materials. By the time this article is in print, there will be further important indices in the retail field. The merchants anticipate that 1956 should have one of the best holiday buying periods on record, and people have the finances to make this prediction come true.

Part of the reason for this expectation is the condition of consumer credit today. It is true that such credit is straining toward very high limits; yet it is also true that on a per family basis, this heavy load of credit extended is not out of line with the ability of people to repay their obligations. Although the total of consumer credit outstanding has reached an all-time pinnacle of approximately 38 billion dollars, the ratio of consumer credit to disposable personal income is showing a decline.

Consumer credit analyzed

It is true that this decline is not a phenomenal one, but it is nonethe-less impressive to economic observers. The ratio of consumer credit outstanding to disposable personal income now stands at about 12½ per cent. Further important considerations in this area are illustrated by the rate of repayment of consumer debt obligations which have shown a steady and satisfying increase over the past few years.

The Federal Reserve Board has analyzed the types of family units that make use of consumer credit and installment buying based upon 1955 income. The middle income group (income of $3,000 - $7,500) show the greatest tendency to buy on this basis. On the other hand, over 65 per cent of the low-income families have no consumer debt obligations of any type. A similar percentage of upper-income families do not have consumer debt obligations either. Thirty-nine per cent of the middle income group has a ratio of consumer debt to disposable income of less than 20 per cent, whereas 13 per cent have a ratio in excess of 20 per cent.

This tends to point out most emphatically that only a small portion of the population of the country has entered into the installment buying technique with any degree of danger of excessive commitment of income. In fact, only 12 per cent of all family spending units show a ratio (as above) in excess of 12 per cent.

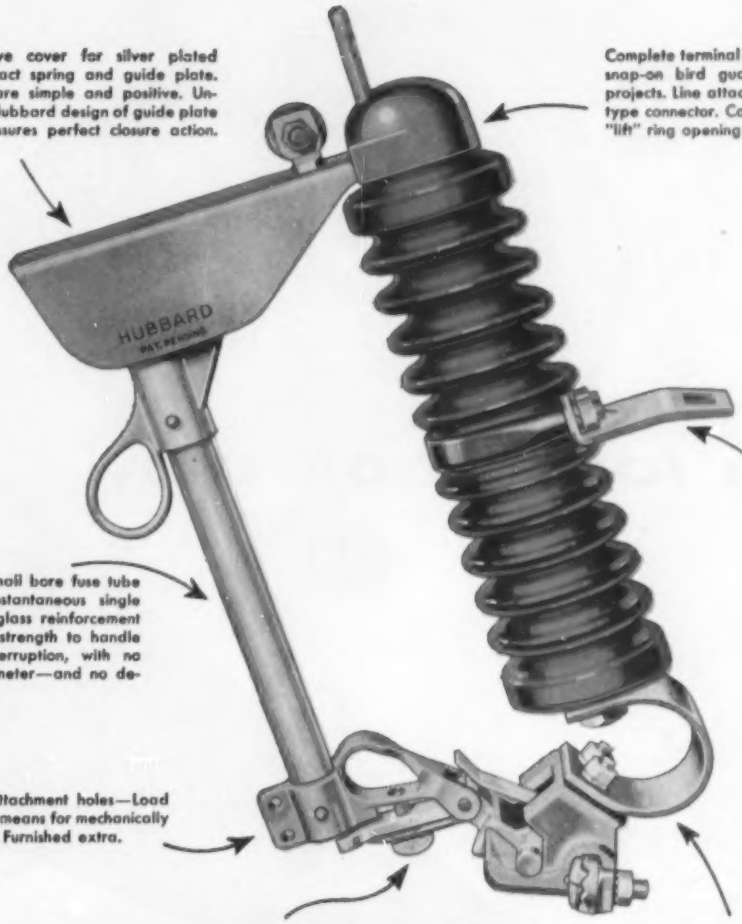
The automotive problem

Although all other facets of the economy seem to be high enough to offset the decline in automobile sales, this area of retailing had been expected to pull up in respectability during the final quarter of the year. As of the end of the first nine months of 1956 business, automobile sales were off from 1955 records about 23 per cent. It now appears evident that any increase in sales of 1957 models will *not* make up this deficiency. Rather, the problems within the industry in the production and distribution of new models have been so great that it appears likely that the end-of-the-year demand may have to go partially unsatisfied.

There have been all manner of forecasts made as to the number of potential buyers who have held off purchase of new cars in order to await the new 1957 models. Auto producers have contributed to this air of expectancy by their many claims of extravagant new designs and newer gadgets to be offered as standard equipment.

If a heavy backlog of orders has been built up by this technique, then it is certain that even superhuman productive efforts will not satisfy the demand. Rather, there may be a very heavy carry-over into 1957, thus making the new year's first quarter a sales record breaker. One thing is fairly certain. Automobile sales and production in 1957 should be far better than 1956 figures, thus further stimulating the economic picture for the next twelve months.

Dr. Bunting is a well-known economist and educator having special knowledge of the South.



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New style, extra strong, insulated hanger. Coating provides bird and animal protection.

Specially designed small bore fuse tube for high pressure instantaneous single vent expulsion. Fibreglass reinforcement provides mechanical strength to handle maximum current interruption, with no increase in bore diameter—and no destructive results.

Load break fitting attachment holes—Load break fittings provide means for mechanically disrupting connection. Furnished extra.

Cam locking device which permits unobstructed removal of fuse holder when in the open position, in addition to locking holder against accidental removal the instant closure is begun. Spring actuated leverage arrangement puts tension on fuse link to aid in quick opening.

Locked recoil absorber bracket is provided to cushion recoil of discharge action. This prevents damage to the porcelain and mechanical assembly under stress of maximum current interruptions.

New Hubbard Distribution Fuse Cutout!

Now from Hubbard a new heavy-duty fuse cutout that opens a new era in the protection of equipment on your distribution lines. Incorporating new electrical and mechanical designs, the new Hubbard Cutout offers tremendous operational flexibility with its ability to clear faults over the entire operating range from minimum to maximum available fault current. No longer will it be necessary to continually check available fault current values at many different points as your system is expanded. What's more, the need for shifting cutouts to handle changing fault current values will be drastically reduced.

Heart of the new design is the small bore fibreglass reinforced, single vented fuse tube. By using a minimum inner diameter fuse tube and reinforcing it with fibreglass for maximum mechanical strength, Hubbard engineers were able to provide the positive expulsion action necessary for safe, sure, instantaneous arc interruption.

To support this greatly increased bursting action, entirely new high strength mechanical components were provided. There are no unnecessary or complicated parts in this new rugged simple design. Gas expulsion and fuse blowing are substantially completed before any parting of current carrying contacts. The entire current carrying circuit is composed of silver plated contacts of the pressure type. All springs are designed to act well below their elastic limits for maximum pressure maintenance throughout the life of the cutout. Positive closing is assured through the cam arrangement of the hinge mechanism which causes the fuse tube hinge to tighten as the fuse approaches the latched position.

Equipped with sleet, bird proofing and dead-end eye to meet local service conditions. Mechanical load break attachment can be specified as needed. Your Hubbard distributor will be glad to supply you with production samples. Call today, or write for a copy of Bulletin 756.

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CATALOGS and BULLETINS

Available Free to Readers of Electrical South upon Request

1048—Plug-in Strip
An illustrated catalog showing the complete "Plug-in" Strip line has recently been published by National Electric Products Corp., Pittsburgh, Pa. This eight-page illustrated brochure pictures the three and six foot standard lengths of the multi-outlet branch circuit assembly.

1086—Cable Connectors
Tomic Sales and Engineering Co., 4864 Woodward Ave., Detroit 1, Mich., now have available catalog sheets containing data on the complete line of their connectors, couplings, and cable connectors.

1088—Fittings and Fixtures
A 32-page illustrated catalog covering Killark fittings and fixtures is offered by Killark Electric Mfg. Co., Vandeventer and Easton Aves., St. Louis 13, Mo.

1092—Electrical Boxes
Steel City Electric Co., 1207 Columbus Ave., Pittsburgh 12, Pa., offers a catalog of their complete line.

1130—Conduit Fittings
The latest completely illustrative catalog on their diversified line of conduit fittings is announced by the Atlantic Conduit Fittings Co., 589 Atlantic Ave., Boston 10, Mass.

1136—Space Heating Guide
Cavalier Corp., Chattanooga 2, Tenn., has prepared a Guide for Calculations on Electric Space Heating. It is based on study of several thousand installations of electric heat and is a handly reference for calculating electric heating requirements and estimating operating costs. The booklet contains discussion, charts, and floor plan examples.

1150—Fluorescent Fixtures
Light & Power Utilities Corp., 1035 Firestone Blvd., Memphis, Tenn., has printed a new catalog of fluorescent lighting fixtures. The new catalog is divided into six sections, each printed in its own distinctive colors. First section is devoted to "General Data" and details to L&P manufacturing.

1166—Electrical Fittings
A 40-page illustrated catalog and price list on the Gedney line. Shown and listed are conduit, threaded entrance, SEC, EMT and ground fittings, and box connectors for both armored and non-metallic cables. Copies are available from Gedney Electric Co., RKO Bldg., Radio City, New York 20, N. Y.

1184—Approved RHW Wire
Bulletin No. 1018 describing first Underwriters' Approved Type RHW Wire, developed to meet the new National Electrical Code standards, is available from Simplex Wire and Cable Co., 79 Sidney St., Cambridge 39, Mass.

1190—Electrical Fittings
Blackhawk Industries, Dubuque, Iowa, offers a complete catalog of electrical conduit and cable fittings. Also a special publication giving detail drawings and instructions for installing service entrance masts on low or ranch type buildings.

1192—Wire Pulling Lubricant
Illustrated six-page folder showing the advantages of an improved Y-Er Eas wire pulling lubricant is available from Electro Compound Co., 3812 150th St., Cleveland 11, Ohio.

1214—General Catalog
General catalog of Royal Electric Co., Inc., Pawtucket, R. I. covering flexible service and lamp cords, cord sets, extensions, trouble lights, wiring devices and decorative Christmas lighting is available to wholesalers. Dealer catalogs may be secured from Royal distributors.

1218—Carbon Products
A 28-page catalog on Motor and Generator Brushes and carbon products telling how to order brushes grade recommendations characteristics and description of brush grades is available from the Helwig Co., 2536 North 30th St., Milwaukee, Wis.

1220—Stadium Lighting
The Pyle-National Co., 1334 N. Kostner Ave., Chicago, Ill., announces the availability of a new eight-page bulletin, No. 605, on stadium lighting, describing in detail floodlighting of a typical outdoor athletic arena stressing the importance of using fully enclosed floodlights.

1224—Electrical Equipment
The Wadsworth Electric Mfg. Co., Inc., Covington, Ky., has issued a new catalog Con 15-0 and Bulletin W. C. B. 53-1, containing data on their lines of Safety Switches, Service Equipment, Distribution Panels and "E-Z-RED" Circuit Breakers.

ELECTRICAL SOUTH
806 Peachtree St., NE **December, 1956**
Atlanta 8, Ga.

Gentlemen:

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now! decorative lighting using stock lighting fixtures

Here's the practical answer to your commercial lighting problem. It's the new Wondabar by Virden. Now you can have smart, dramatic lighting at a most economical cost. For the Wondabar uses *standard* lighting fixtures. You can choose, from Virden's wide selection, the fixture that fits your decor.

It opens up an entirely new range of effects, makes possible decorative lighting formerly possible only with expensive, custom-designed fixtures.

Installation is economical, too! In most cases, the Wondabar can be installed quickly and easily to the present fixture outlet—without rewiring or expensive remodeling.

Wondabar kits are available in 3, 4 or 5 arm spreads, for use with any standard loop-equipped fixture. Almost any length ceiling drop is available. Your nearby Virden distributor has them Or write John C. Virden Co., Dept. ES-12, 6103 Longfellow Avenue, Cleveland 3, Ohio.

The Wallace Company, Poughkeepsie, N. Y. Warm, even lighting from smart, modern fixtures gives this furniture department an entirely new look—at a cost far below custom-made fixtures.

decorative lighting by virden

Pan Dee Restaurant, Chicago, Ill. Note how this 5-unit Wondabar using standard Virden fixtures complements the modern decor of this restaurant. Here is dramatic emphasis and soft, easy lighting at a fraction of the cost of custom-made fixtures.

1230—Compression Connectors

An illustrated 18-page bulletin (13A) describes Squeezon compression connectors for all overhead distribution connections from line wire to ground rod. Offered by James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo., the bulletin also describes the mechanical and hydraulic installation tools required and tells where to use each.

1238—Selecting Fuses

A 12-page descriptive handbook "Fuseology" tells how to get safest, most dependable, trouble-free electrical protection from fuses. Contains useful information on selecting right size and type of fuses—how to stop needless blows—avoiding poor contact and other troubles. Issued by Bussmann Mfg. Co., University at Jefferson, St. Louis 7, Mo.

1240—Lighting Fixtures

Prescolite Manufacturing Corp., 2229 Fourth St., Berkeley 10, Calif., now has available a 20 page color catalog, No. 31-F, describing their complete line of lighting fixtures including recessed series and accessories, surface series and accessories, exit lights, and aisle lights. A typical installation and dimensional drawing are shown for each fixture.

1244—New Electrical Fittings Catalog

Concise 36-page catalog illustrates and describes a complete line of electrical fittings, cable racks and wiring specialties. The catalog contains many detail drawings, clear-cut photographic illustrations of mast fittings, cable connectors, straps, hangers and ground clamps in a wide variety of types and sizes. For your free copy, write The M. & W. Electric Mfg. Co., East Palestine, Ohio.

1248—Conductor Armor

A new catalog of Superformed Armor Rods, Lineguards, Patch Rods, and Tap Armor describing various uses and applications of these products on overhead conductors is offered by The Fanner Manufacturing Company, Brookside Park, Cleveland 9, Ohio.

1250—Electrical Enclosures

Catalog No. 5354 currently being offered to the trade by B & C Metal Stamping Co., 590 Means St, N. W., Atlanta, Ga., is a well-organized, 66-page manual giving complete descriptive information, prices, and specifications on all items in the B & C line of electrical enclosures. Copies are available free of charge to electrical contractors.

1254—Construction Anchors

"Anchoring for Power and Communication Linese," a completely illustrated manual on improving line construction with better anchoring, has been published by the Advertising Dept., the A. B. Chance Co., Centralia, Mo. The 25-page booklet shows how to install the right anchor at the right place in the right way.

1262—Fluorescent Fixtures

The new loose-leaf catalog recently issued by Southern Lighting Manufacturing Co., 501 Elwell St., Orlando, Fla., contains complete diagrams, specifications, and descriptions for all fluorescent fixtures which they manufacture. In addition to the information on commercial, industrial, and school fixtures, the catalog also lists hangers, troffers, troffer accessories, and incandescents which are available from the firm.

1264—Thiel Fasteners

Literature is now available on Thiel Easy Drive staples and other fasteners such as Hump Drive "Nail-Its," "Grip Type" 1-hole pipe straps, hangers, etc. Write to Thiel Tool and Engineering Co., 1417 N. Market St., St. Louis 6, Mo.

1266—Metal-Clad Switchgear

Detailed information on metal-clad switchgear is now available in two special bulletins, 7004-B and 7004-C. These booklets give descriptions, application data and specifications on units up to 15 kv and 500,000 kva interrupting capacity. Wire I-T-E Circuit Breaker Co., 19th and Hamilton St., Philadelphia 30, Pa.

1268—Lighting Fixtures

The Perfeclite Co., 1457 East 40th Street, Cleveland 3, Ohio, makes available the following literature: (1) Data Folder 54-B—4 pages of engineering information, prices and specifications on Plastic Indirect Concentric Ring Luminaires. (2) Data Folder EX-55-A—10 pages of information on Exit Units for all building locations. Complete engineering data and prices given. (3) Data Folder 56-A—information on Ceiling Pan Fixtures and Vapor Proof Prismatic Exterior Fixtures.

1270—Aerial Ladders

J. H. Holan Corp., 4100 W. 150th St., Cleveland 11, Ohio, has just published a 4-page catalog on their Series 2200, Mechanical Ladder. They also have a new catalog on their Series 2100 All-Hydraulic Ladder.

1276—Attic Fans

A new four-page, two-color catalog (Bulletin 7514) describing the new Model CA Ventura attic fans for residential "comfort cooling" is now available from American Blower Corp., Detroit 32, Mich.

1278—Porcelain Insulators & Hi-Line Hardware

Knox Porcelain Corp., Knoxville 1, Tenn. has recently released catalogs containing complete information on their suspension, pin-type, spool and guy strain insulators as well as Hi-Line hardware and bushings.

1280—Electric Heating

Electromode Division of Commercial Controls Corp., 45 Crouch St., Rochester, N. Y., has issued a new catalog listing their complete line of electric heaters, including bathroom, wall-type, portable, baseboard heating, radiant heating panels, various industrial units, and combinations. Also included in Catalog No. 31-K-3 are complete specifications and price list.

1282—Exit Lights

A four-page catalog providing illustrations and specifications for their complete line of exit lights has been released by Curtis Lighting Co., 6135 W. 65th St., Chicago 38, Ill. Types of mountings illustrated include recessed, end to wall, ceiling, direct wall, and pendant.

1284—Electric Radiant Heating

The design and installation of electric radiant heating is covered comprehensively in two publications just released by General Electric Co., 95 Hathaway St., Providence 7, R. I. Designers of heating systems will find valuable information in a 24-page Electric Radiant Heating Design Manual. A 36-page manual explains and illustrates how to install G-E Electric Radiant Heating in homes.

1288—Electric Ventilators

An illustrative 8-page folder, Bulletin 620-L, showing typical installations of a complete line of ventilators for wall, ceiling ,laundry, bathroom, kitchen, and small rooms, is available from Trade-Wind Motorfans, Inc., 7755 Paramount Blvd., Rivera, Calif.

The folder includes dimensional drawings of installations helpful to building and electrical contractors.

1290—Wiring Equipment

Keystone Manufacturing Co., 23328 Sherwood, Center Line, Mich., has issued a new catalog (No. 156) giving complete specifications and illustrations on their line of wiring installation equipment. Included in the 40-page catalog are wireways and fittings, cutout boxes, outlet boxes, switch boxes, and cabinets, giving Code requirements, and price sheet.

1292—Conduit Bender

A new bulletin containing operating instructions on several easy methods of bending rigid and thin-wall conduit with the "Chicago" Bender is now available from Gustave Lidseen, Inc., 1000 First St., Hayesville, N. C. Bulletin 556 is illustrated and contains a price and parts list.

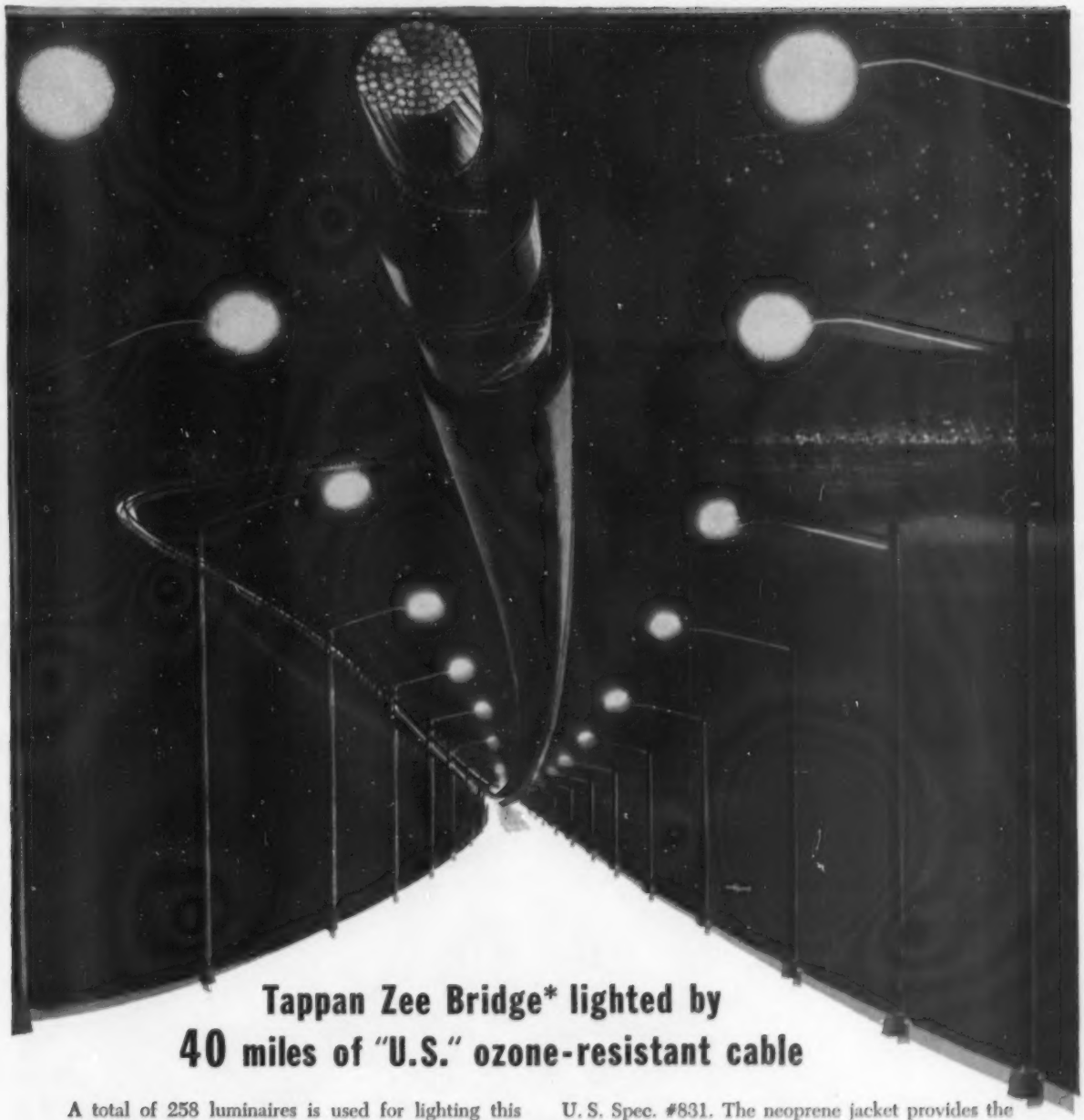
1294—Lighting Fixtures

Ainsworth Lighting, Inc,, 38-10 29th St., Long Island City 1, N. Y., has issued a new catalog illustrating their complete line of fluorescent and incandescent lighting fixtures for schools and offices.

1296—Engine Generators

Wincharger Corp., Sioux City, Iowa, has available a complete catalog on their Winco engine-driven generator plants. These units range from 300 watt d-c to 10,000 watt 60-cycle a-c.

US RUBBER STREET LIGHTING CABLE



Tappan Zee Bridge* lighted by 40 miles of "U.S." ozone-resistant cable

A total of 258 luminaires is used for lighting this bridge spanning the Hudson River, making it probably the best-lighted bridge in the world. To minimize distribution costs, constant current series circuits are used.

The 40 miles of cable used on this lighting system is *ozone-resistant* "U. S." Series Street Lighting Cable, Uskorona – 2, butyl insulation, 7,500-volt shielded, U. S. Spec. #831. The neoprene jacket provides the greatest protection against weather, acids, oils and all-around abuse. Yet the cable is light in weight and easy to handle.

For electrical wires and cables to fill any requirement, to handle any wiring need, write Electrical Wire & Cable Department, United States Rubber Company, Rockefeller Center, New York 20, N. Y.

*Part of New York State Thruway system

US RUBBER Electrical Wire & Cable Department
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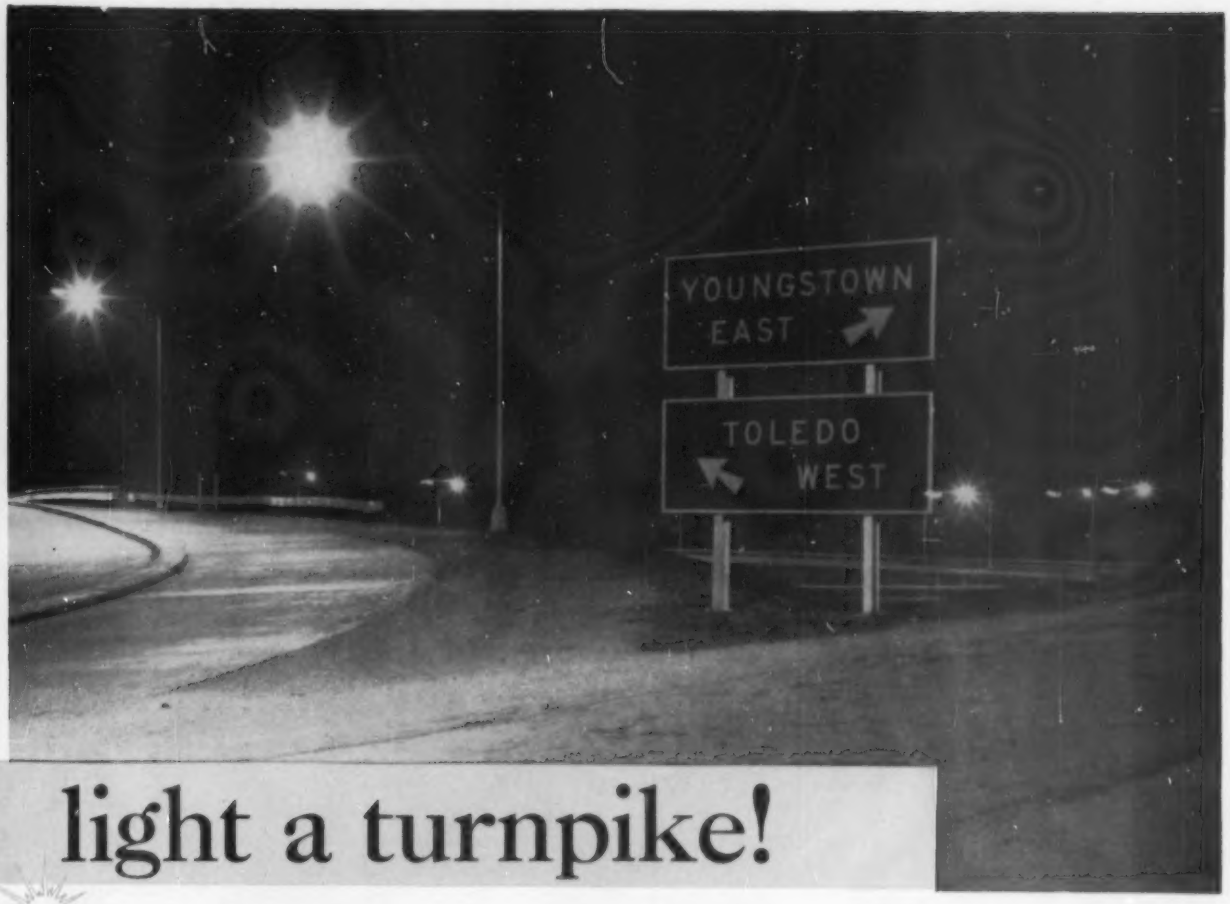
HERE'S the way to



light a turnpike!

The new Ohio Turnpike, spanning the state from Pennsylvania to Indiana, is a model of modern highway construction. And one of the outstanding features of this road is the lighting of the interchanges.

What an immense job it was to build this 241-mile road! Enough dirt was excavated to fill a two-lane tunnel 268 miles long. They dumped enough fill to cover 500 football fields to a depth of 28 feet. Carefully the bogs were drained, slides were stopped and the rock was blasted to make the great road possible.

Skillful engineering is apparent along every foot of the Turnpike—and this includes the selection of vital materials used to build it. Buried in the ground near the interchanges you'll find over half a million feet of Tiger Brand 3,000-volt internal shielded cable serving as main feeders. Many thousands of feet of Tiger Brand RR cable serve as bracket cable in the poles, and an additional quarter million feet of Tiger Brand cable grounds the entire system.

When you install Tiger Brand cable, you have gone a long way toward insuring a trouble-free wiring system.

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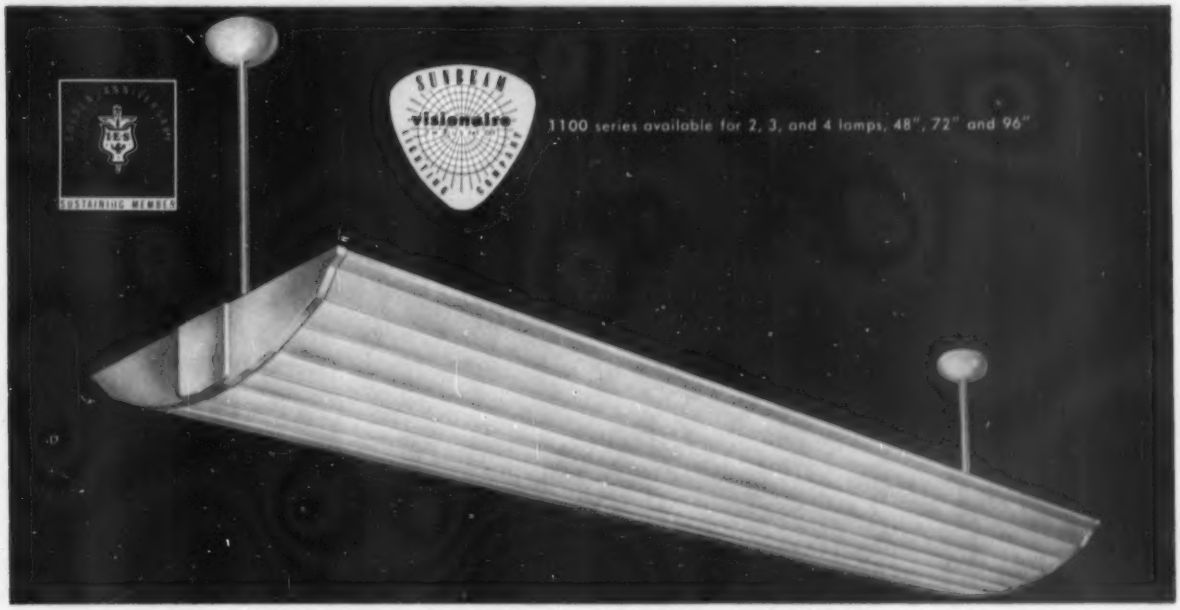
READ HOW EASY it is to perform difficult visual tasks with the new, totally indirect Sunbeam Lighting **1100** series. The unusually broad distribution of uniform, glareless, low brightness, high intensity illumination produced by this pendant Visionaire establishes new concepts of visual comfort. With its soft, eye-easy, luminous effect and clean-lined beauty, this **all-white** unit is perfectly designed for schoolrooms, offices, drafting rooms and other areas where the seeing task is critical.

Consider also the long-range savings available with this **all-metal,** low maintenance Visionaire. Parallel metal louvers allow circulating air currents to keep louver and lamp surfaces dust free. After mounting easy-to-handle fixture frame by **"hook-on"** method, the shielding cradle



hinges into place without tools for quick installation. The **1100** series relamps from the top without removing any part of fixture. Units available for use with higher lumen lamps, typical of today's trend. All metal parts are Bonderite-treated for lifetime corrosion resistance. Write for Bulletin 747 today.

Sunbeam Lighting Co., 777 E. 14th Pl., Los Angeles 21, Calif.

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This engineering achievement, the result of cooperative American and British enterprise, signalizes a new era of greatly improved Transatlantic telephone service.

Simplex Wire & Cable Co., as manufacturer and supplier of the American-made part of the submarine cable used in this gigantic project, is understandably proud to have participated in this historic accomplishment, and in the development work which made it possible. **SIMPLEX WIRE & CABLE CO.,** 79 Sidney Street, Cambridge 39, Mass.

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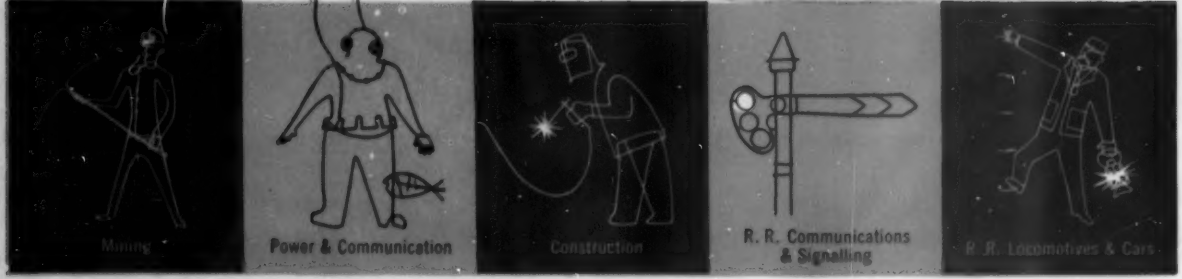

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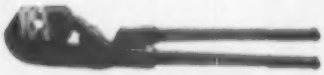

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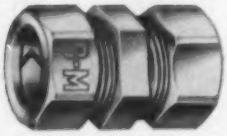

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SIZES
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SIZES
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A practical look at

A major consideration in soliciting maintenance contracts should be the customer's potential for future work. Constant minor repairs on a small job—a one-time operation—can cut into profits quickly. By emphasizing advantages, D'Arcy Electric Co., Atlanta, Ga., has found maintenance contracts not too difficult to sell.

◆ MAINTENANCE CONTRACT work totaling 20 per cent of their overall volume keeps skilled electricians employed during slack seasons at D'Arcy Electric Co., Atlanta, Ga. However, a contractor should carefully consider the customer's potential for future work before getting an agreement with him for a maintenance contract, according to Mr. E. Smith Smallwood, partner.

"There are many schools of thought regarding the need for obtaining a maintenance contract after completing a job for a customer. We stick to the middle-of-the-road theory that it is best to solicit maintenance contracts from customers who will in all probability have expansion or major alterations in the near future. In these cases, the contractor keeps the customer happy with his present installation with prompt service in order to get first call on future work.

Contract considerations

"If the job completed is a small one—a one-time operation—the customer will probably need a contractor's electrician every time a fuse blows if he has agreed to a maintenance contract. This type of customer will be discouraged if we present him with a bill for $12 to $15 to make a call to replace a fuse on repeated occasions. Since he will have little or no future work for us, we cannot assume a large loss of time by taking a man off a job and sending him out to put that fuse in the line. So, we try to avoid maintenance contracts on small jobs.

"On the other hand, we have one maintenance contract with a large automotive supply business in Atlanta on their warehouse. We installed the original wiring which included electric service, lighting, warehouse lights, and air conditioning. We secured a maintenance contract with them because they will, no doubt, have a major expansion soon.

"This concern gave us a nice job only a short time ago. This was a sizeable job—the addition of a special display area—and in the mark-up for this job, we were able to make up a little of the profit we lost by giving them service on small troubles.

With this particular concern, we add 10 per cent for overhead and 10 per cent for profit to our service bills. This is after the inclusion of material costs, labor, 8 per cent for insurance, and other special charges. For example, if we have to take a man off one job and send him out on the call, we pay him mileage for his car from the first job to the second.

Verbal contracts

"All of our maintenance contracts are verbal ones," Mr. Smallwood continued. "We sit down with the owner of the building and outline what we will do to keep his electrical circuits operating perfectly. We get a chance to educate him regarding the cost to us of taking a man off a job to answer an emergency call for him. We establish whether he wants a bill itemized or not, and if so, we also establish the per cent of overhead and profit which we will normally add to the call.

"Many of our accounts know that our work is of high quality and that our men are well-trained and expensive to us. They do not require itemization of bills and are not unhappy if we get as much as 30 per cent mark-up profit on

E. Smith Smallwood, left, and Preston G. Puckett, D'Arcy Electric Co., Atlanta, check circuit diagrams on job the firm is completing at present. Intimate knowledge of circuits puts firm in good position for maintenance contract with cusomer after original work.

maintenance contracts

our service calls. These concerns want prompt service, and they are willing to pay for it. Naturally, we do everything possible to keep these customers operating without trouble.

"In order to keep our costs as low as possible, we try to handle most service calls with an electrician rather than an engineer. When an engineer goes out on such calls, after he determines the problem, he then must call in and have a truck dispatched with the necessary parts and an electrician to repair the trouble. This is too expensive. Usually one of our electricians can accurately spot the trouble. Then, if he does not have the necessary parts, we can send them out by another truck which can then go on to another job.

Examples of the types of jobs D'Arcy Electric Company encourages for maintenance contracts are: a 5-story building erected by a national insurance company; a 14-store shopping center; and a new dairy and brewery—each of which has special installation problems.

"In the case where special circuits are installed, we feel obligated to suggest a maintenance contract," explained Preston G. Puckett, general manager. "An electrician from another company could do a great deal of damage to the circuits, because of his being unfamiliar with them. He may not know the capacity of certain feeders and could easily overload a circuit, causing the loss of a whole system. We protect ourselves by requesting a maintenance contract on these special jobs.

Figuring charges

"Our approach to setting the charges for service work is consistent," Mr. Smallwood said. "We figure material costs — including wholesale stock and that from our own stock. We figure the labor charge—labor hours times a fixed rate per hour. We add 8 per cent of the labor dollar value which will cover Social Security and other insurance costs. We total these charges and then add our overhead and profit which usually runs 20 per cent. Depreciation of equipment and tools is usually taken off on our larger jobs."

"Our profit margin varies somewhat, depending on the size of the service job," Mr. Puckett pointed out. "For most trouble calls of $15 or less, our overhead comes to 40 per cent. After a mark-up of 10 per cent for profit, this makes a 50 per cent mark-up which most small customers feel is too strong. However, we cannot operate for less than these figures when answering service calls.

"If the call runs over $100, we mark-up around 15 per cent for profit, and when the job exceeds $200, we usually add only a 10 per cent overhead and a 10 per-cent profit figure. On some large jobs, we cut our bid down by reducing our profit margin to as low as 10 per cent.

"We have found that a mainte-

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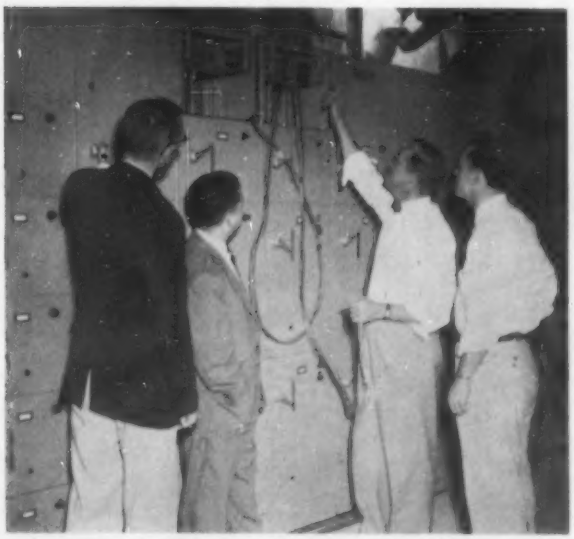
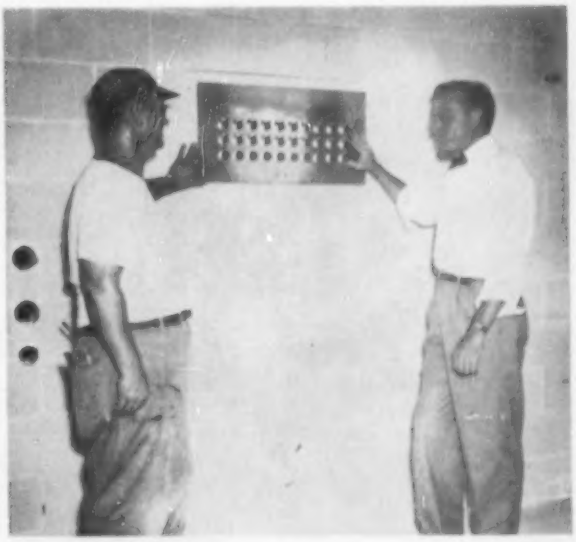




Mr. Smallwood and Mr. Puckett discuss function of control panel with manufacturer's representatives. This particular job has many special circuits because building will house a dairy. Cleanliness, requiring frequent hosing with hot water on surfaces and machines, poses special problems for electrical installers. At right, Mr. Smallwood and job boss check position of push-button control panel and double check waterproof characteristics. Machinery will be run from panels with no start-stop buttons on machines.

Selection and maintenance of

Adequate tools and equipment can often be the deciding factor in selection of a contractor. Power Electric Co., Jackson, Miss., has found that the proper selection and maintenance of power tools and other labor-saving equipment enables them to secure more and larger jobs, and give the customer faster, better service.

By H. F. Crouch, Construction Manager, Power Electric Co., Jackson, Miss.

◆ WITH OVER $2 million of electrical construction now underway, covering every phase of electrical work from house wiring to heavy industrial installations, we at Power Electric are always searching for new methods and tools to facilitate our work.

In the first place, we feel that having enough of the right tools and equipment is often the deciding factor when a prospective customer considers a contractor to perform his work. This is particularly true if negotiated construction is being considered.

What do we mean by the "right tools and equipment"? This may best be answered by quoting Abe Lincoln's famous answer when he was asked how long a man's legs should be; "Long enough to reach the ground," he replied. That's about the way we feel about it when sending tools to a job. We aim to send enough to do the job; in other words, the right tools, at the right place, at the right time.

Average tool supply

And to help us be right most of the time on our industrial installations, we have arranged an average supply of tools for each "gang," which usually numbers from 4 to 10 men, depending on the type of job.

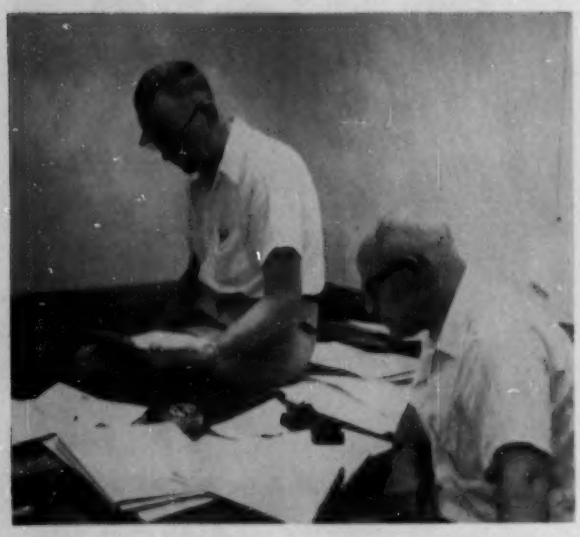
Naturally, the application and use of any specific type of labor-saving power equipment depends on the work to be done; and whether or not the work is repetitious or conventional construction. Ordinarily, each gang box on larger jobs is placed strategically so that travel from job to box is no more than 100 feet. The normal complement of tools for each box includes: 2 - ¼" light duty electric drills, 1 - ¾" heavy duty electric drill, 1 - Remington stud gun, 2 to 4 sets of ropes and blocks, 1 - large or small Chicago floor bender, pipe bicheys - fish tapes - and small standard tools, etc.

Adjacent to each gang box is a portable work bench with a machine vise and grinder; a portable bevel with chain-tong vise for a large universal power threader; one hydraulic bender with interchangeable knock-out punches.

Power saws, while not a part of each gang's equipment, are placed at frequent enough intervals to help eliminate "ganging" around while one man cuts a piece of pipe.

Tool combinations

In order to minimize costly investment in a large variety of power-driven tools, we have found it practical to build combinations; using the power of one tool to operate another. For instance, when our work load justifies, we retire the conventional power pipe threader in favor of a portable threader which by the addition of



Norville Ogden, left, president, and H. F. Crouch, construction manager, check supplies for a Power

Electric Company job. At right, employees power pipe threader by using insert tool in Lawco portable.

labor-saving tools and equipment

a small square and chamferred insert, provides very good power to any column-mounted drum hoist. With this combination, small sections of switch gear, floor standing motor starters, and large junction and pull boxes requiring long cable pulls are easily handled.

Another time- and labor-saving piece of equipment that we use quite extensively is our stake body trailer pulled by our ½- and ¾-ton pickup trucks, all of which are fitted with trailer hitches. The trailers are loaded at the warehouse with needed size wire spools and pulled into the plant under construction. There, the men pull wire directly from the trailer. When wire runs out, the trailers are sent back to the warehouse for reloading. This method saves having material scattered all over the job, and places the material right where the men need it without the usual re-handling problem.

For industrial and commercial work, we lean strongly toward aluminum rolling scaffolding. While a little more expensive for initial investment the savings in erection and tear-down labor more than justify the additional cost. We have one pick-up truck fitted with platform scaffolding from radiator to tail gate. This is two sections high, and can be used where structural beams and bar joists are 17 or 22 feet high.

On one job this arrangement allowed our crew to install 4,000 feet of 225 ampere and 400 ampere busway and supports at the low figure of .32 man-hour per foot. But on another job it was practically useless due to obstructions by other mechanical trades.

A problem that we have given some thought to is three-phase and single-phase power equipment mixed on the same job presenting some temporary wiring difficulties. Usually the owner, or general contractor, wants only enough temporary service to supply very few foot-candles of light here and there. Of course, many of the owners or contractors are not familiar enough with the principle of three-phase to provide for it in their estimates.

Consequently, the electrical contractor who establishes this service for his own requirements finds it so well loaded that he cannot turn over a power saw, or make a good weld, if any distance from the power source. In our own organization, the thinking lately has been toward the use of 3 to 5 kva portable gasoline geenrators to furnish our power on construction jobs. These are available, rebuilt, at quite reasonable prices, and should solve the adequate power problem for our crews.

Power tools are limited only by

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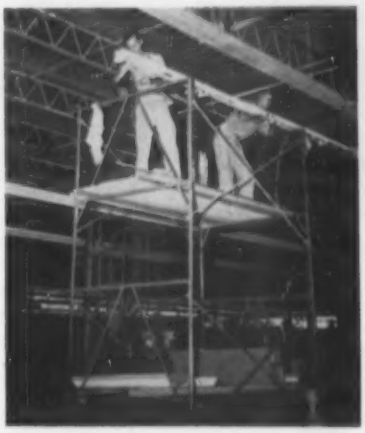


Lightweight aluminum scaffold aids erection of continuous fluorescent fixtures in factory job.

At left, Power Electric job supt. M. J. Webb, and Jack Sykes, job foreman, watch operation of power saw. At right, scaffold mounted truck makes it easy running feeders from main switch gear through bus duct.

Tool storage and repair

A prefabricated, portable tool warehouse for on-the-job storage has proved economical as well as convenient for Travis Electric Co., Nashville, Tenn. Their simple but effective check-out system keeps track of every work tool from the time it leaves the shop.

◆ WHENEVER Travis Electric sends a crew of workmen out on a distant new job, a knocked-down tool warehouse goes along with them. This warehouse is composed of corrugated metal parts and is put together at the place of operation. When the workers knock off at the end of each day all the tools are placed in this portable storage house and locked up for the night.

It has proven to be a safe sanctuary for all the valuable items that necessarily have to be used on any important job where it would be inconvenient to return them each day to the Nashville, Tenn., headquarters. The firm has never had a tool stolen from this portable lock-up.

This warehouse may be either a 6 ft. by 12 ft. unit, or a larger number of such units bolted together, depending on the number of articles to be stored. Sometimes it takes as many as 5 such units, or a 60-foot-long warehouse to take care of all Travis storage needs on a specially large contract.

"These portable units were designed by the Travis partners," said Wade Travis. "The corrugated sides, ends, and roof, plus the pine floor, are prefabricated by a local building contractor. Every piece is made to fit in place and there is nothing to do at the site except to bolt them in place. Four men can throw a 3-unit warehouse together in a half day.

"Sometimes, however, we have a job where we do not need even one knocked-down storage unit of that size. We may have a lot of smaller but valuable tools that do not require so much lock-up space. For this purpose we have a 3 ft. by 4 ft. gang box made of wood into which we dump the work items at the end of each day and lock the box up."

"What is to prevent a thief from picking up the whole box and carrying it off some night." Wade was asked.

"If the box has to be left out in the open we try to chain it to a nearby tree or other immovable object. If a ladder is used on this job we chain the ladder to the box for safekeeping. After the job has progressed far enough along, the box and ladder are locked inside the building."

Check-out system

Travis has a simple but effective system for keeping track of every work tool from the time it leaves the Nashville shop until it returns. "When a crew starts to work on a new job," explained S. L. Lewis, the superintendent, "we list every tool on a check-out card. The card contains only three column spaces—name and description of item, the place from which item is checked out, and the specific job to which it is assigned. The foreman in charge of the job to which the tools are commissioned has to sign the card after seeing that he has all the articles listed. He is responsible for the safekeeping of the tools until returned. It is his responsibility to see that everything on his check-out list is locked in the portable warehouse or gang box at the end of each day. When the tools are returned to the Nashville shop they are checked back in from the same card on which they were checked out."

Travis Electric handles many important electrical construction jobs within a 100-mile radius of Nashville. They include many jobs in counties of middle Tennessee and southern Kentucky. It has done quite a bit of work at Fort Campbell, a large military base north of Nashville.

The company has accumulated quite an inventory of labor-saving tools, but buys each one only as it bumps against a need that indicates pay-off possibilities.

"Take that hydraulic knockout punch," said Mr. Lewis. "We bought it eight months ago when we were doing the electrical work on the Airport Facilities building near Joelton. The building had a metal ceiling through which a number of outlets had to be drilled. We were sweating along on a little hand tool that was consuming a lot of costly labor time. We bought the Black Hawk and put each hole through that ceiling in no time at all. We have found it invaluable on plenty of other jobs. I'll say that it cuts out at least two-thirds of the labor time over our old method of doing it."

Mr. Lewis described other tools the firm bought on different occasions to save precious time, high priced labor, and to speed up work from one job to another.

Portable pipe threader

"For example, that portable pipe threader we bought a year ago has cut out a whale of a lot of time and drudgery. The old threader that we used up to that time, and still use for certain work, was a heavy cumbersome sort of tool that took two or three men to move. It was too heavy to move easily above ground level. If our men were working on the 12th floor of a multi-story building and had to thread a pipe, they had to send it all the way back down to the ground to get it threaded.

"Our new threader is easy to lift and can be carried up to any story level where a pipe can be threaded right at the point of action. It can thread any size from ½-inch to 4 inches."

Mr. Lewis also told of the bender which Travis has now been using for two years. It replaces a heavy bending outfit that required up to three men to handle. The new machine is light and easy to carry to any needed spot. Not only that, but it can bend conduits after they are put in place. It

system

can bend anything from one to four inches.

There is no question but that the high-priced labor time that can be saved on each new-improved tool soon pays for its use. Every hour saved permits the work crew to move on to the next job that much sooner and thus handle more contracts. According to Travis, the ability to do any phase of an assignment more speedily and thus to complete a contract sooner, enables it to handle more deals.

Take, for example, a customer who is dickering with one electrical contractor who agrees to do in six weeks an electrical construction job on an old building in which the customer is carrying on a mercantile business. The mercantile operations will be heavily handicapped while the electricians are working around and keeping things torn up on the premises. A competing contractor with the latest speed-up tools agrees to complete the work and be out of the way in four weeks. Which of the two contractors will get the deal, even though the money bids are equal?

Another labor-saving Travis tool that has been a lot of help in expediting each contract is the stud-fastening gun. Still another is a special scaffold which comes in very handily in hanging heavy fixtures and conduits. The megohm meter has been invaluable in testing resistance in cables, testing for moisture, breaks, insulation, etc.

Operations are also speeded further by a set of portable workbenches. One bench that can be easily trotted from one place of need to another is equipped with a pipe vise. Another kind has a regular machine vise. Some of these portable benches fold and some roll.

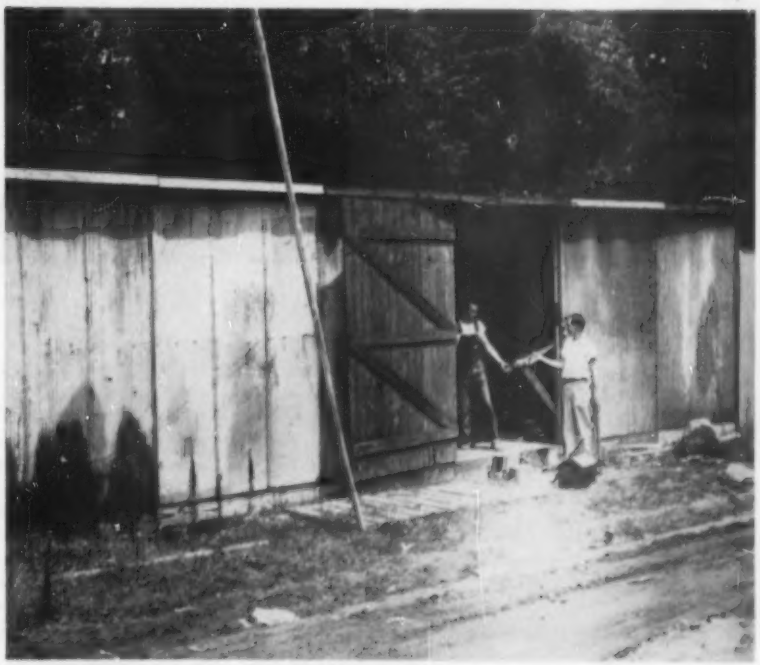
And there is the electrical bench grinder—and the end is not yet.

Maintenance system

When asked about this method of maintenance and repair on his different labor-saving tools,

(Continued on page 82)

Wade Travis, left, Travis Electric Co., Nashville, Tenn., checks out on his check-out slip some of the power tools and other equipment for one of his jobs. The check-out card contains only three column spaces—name and description of item, place from which item is checked out, and the specific job to which it is assigned.



Two Travis workmen put away for the night in the portable warehouse some tools used during the day on the electrical construction job at Mid-State Baptist Hospital. This warehouse is assembled with prefabricated sidewall, floor and roof panels bolted together. It can be easily unjointed and put at another work spot.

N. G. Harrison, left, confers with B. G. Young, purchasing agent for Cleveland Electric, concerning tool requirements for a new job. This firm uses standard form which lists tools normally needed for most jobs to speed up accountability system.

Practical tool control system

When a firm maintains a $15,000 inventory of power—and labor-saving tools, a clear-cut approach to computing tool costs, control, and depreciation is a must. Read how one firm handles these important aspects of its tool operation.

By N. G. Harrison, Vice-President —Construction, Cleveland Electric Co., Atlanta, Ga.

◆ TOOL EXPENSE is as much a part of job costs as are conduit, tubing, conductors and other materials, and the firm that simply charges tool costs to its general overhead will find these costs eating them up.

Tools are important in order to do a faster job of installation. As a firm's investment in tools increases, the cost of its labor decreases—particularly on the larger jobs where hydraulic benders and other more expensive tools can cut hours off of labor costs. A reduction in labor costs usually more than offsets the addition of labor-saving tools; consequently, the cost of these tools must be considered an integral part of job costs.

Here's an example used in the National Electrical Contractor's Research Manual that clearly illustrates what I mean. Assume that the estimated cost of labor on a job is $10,000, and the cost of tools (depreciated and consumed) is estimated to be $300 or 3% of the labor costs. Suppose you find that you can cut down on your estimated labor by $1,000 by raising your estimated tool costs to $500 and adding improved, labor-saving tools. This increase in tool costs by $200 has knocked $1,000 from the customer's cost.

Using the same problem, we can set the percentage we must *add* to the estimated labor charge to pay for our tool costs. Divide tool costs ($500) by estimated labor costs ($9,000), and the resulting percentage of labor to be added is 5.56% or $500.40. This illustration also shows that as the investment in tools increases, the cost of labor decreases, and the percentage to be added to labor, for tools, increases rapidly.

As a general rule, we add 4% of the estimated labor costs on our smaller jobs to cover tool costs, though this may vary from time to time. To this figure may be added incidental costs of maintaining and repairing tools damaged or worn-out on the job. For example, if a tool is broken on a job, and the work requires correction in our machine shop, we have the machinist fill out a time ticket which is filed in the job file and charged to it.

Tool accounting

We try to keep our tool accountability system as simple and easy to use as possible. When we accept a job, the estimator gives us a list of the tools and equipment that will be needed. Using this list, the electrical superintendent supervising the job makes out one of our tools and equipment forms in triplicate. On this list, we have printed most of the tools and equipment used on the average job. We leave plenty of room on it for the inclusion of additional items, if needed.

This form is signed by the person who checks the tools out of our tool stickroom. After that, the stockkeeper files the original in his files, gives the duplicate to the man checking the tools out, and sends the third copy to the office for filing in the job file.

Incidentally, we keep a man in charge of our stockroom from 8 a.m. to 4:30 p.m. each working day. Since many of our electrical superintendents do not check out tools until they are needed on the job, we must have someone constantly attending this check-out procedure.

This man supervises our 900 sq. ft. stockroom as well as the larger garage in which we keep our ladder stock.

For on-the-job storage, we provide sheds, trailers, or gang boxes

At left, stockkeeper returns a 2-inch pipe threader to its storage place in stockroom. He issues tools as they are needed; fills out tool and equipment sheet for every item released for a job. At right, Ralph Medlock, electrical superintendent, checks tools assigned to one of his gang boxes on job location. According to Mr. Medlock, a conscientious superintendent can prevent most losses by frequently checking tools. On last major job, Mr. Medlock lost only one item—an eight-foot ladder.

for our tools. In addition, we provide small steel tool boxes for smaller tools. When not in use, tools are usually stored in the gang boxes or sheds which are locked at night.

The electrical superintendent assigns a man to be responsible for each gang box in use, and then makes frequent checks to be sure that the man is keeping track of the tools.

We paint our tools a distinctive color combination while they are on a job. For instance, Frank E. Medlock, electrical superintendent on an Atlanta hospital job, selected a two-color combination of orange and green by which to identify his tools. We have from $3,000 to $4,000 worth of tools on that job, so a color scheme greatly helps to identify our equipment. The colors are selected so as not to be confused with the color system used by any other contractor.

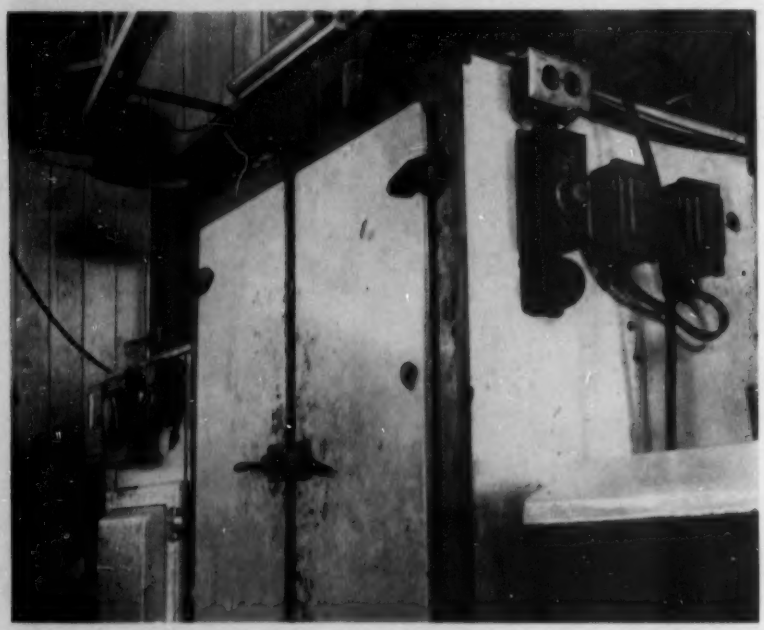
Naturally, the provision we make for storage on the job depends on the quantity of tools we are to use. On some jobs, we have had as high as $5,000 to $6,000 in tools issued. Many of the smaller

(Continued on page 81)

A Cleveland Electric machine shop foreman repairs a Whitney punch broken on a recent job. Time ticket for work on this item is issued by machine shop and is filed in job folder for charge to job.

Equipment ideas for electric repair firm

Back-breaking loading and unloading from the inner recesses of panel-body trucks is eased and speeded by a hook bent from 3-inch pipe suspended from a chain hoist running on a beam that leads to loading-platform entrance of this Florida electric repair firm. The chain hoist is pulled out to meet the truck beneath the aerial beam and the pipe-hook can be pushed inside the truck's body.



A discarded freezer and refrigerator, equipped with high-wattage electric strip heaters and heat-controlling thermostats, provide efficient ovens for baking paints, varnish, etc., on machine parts, in shop of F. Swearinger, Fort Myers electric repair firm.

Welding cuts time on electrical jobs

ELECTRICAL contractor of Sidney, Ohio, Herb Schlater, is taking advantage of a transformer type arc welder to save time and labor on electric service contracts. For example, on the high school job in the pictures over 800 conduit straps were tack welded to mount the electric conduit on steel bar joists. According to Mr. Schlater, bolts or self fastening screws would have required over twice as much time as tack welding.

Electrician using transformer type arc welder to tack weld conduit straps to steel bar joists. (Hobart Brothers Company photos.)

Gymnasium of high school where electrical conduit straps were tack welded to steel bar joists to hold conduit permanently in place.

Labor-saving tools and devices

Increasing wage rates, the trend toward shorter completion date periods on jobs, and the need for better organization of the job in order to meet today's highly competitive bidding, give electrical contractors justification for considerable investment in power type and other labor saving tools and devices.

Presented here are several pages of labor-saving tools and products recently announced by their manufacturers. For additional information on any of these items, please use the coupon on page 61, indicating the key number of the item or items in which you are interested.

Remote control benders for variety of purposes

THE Tal Bending Equipment Inc., 417 N. Water Street, Milwaukee 2, Wis., manufacturers of pipe bending equipment, announce their light weight RC remote control benders. The net weight, complete, is only 68 lbs. This is a "One Shot" bender making any degree bend in one set-

ting, and is available for pipe or rigid conduit, bus bar, and for radiant heat. It can also be had to bend EMT or copper tubing, and with a pipe straightener, if used with the standard all purpose frame.

It can also be obtained with an electric motor pump, can be used anywhere on the job and in any position, and saves considerably on cutting, threading or welding, and on the handling and assembling of cut-up pipe, put together with welded or threaded fittings.

The bending frame has a removable top-plate which permits laying the pipe in from the top, slide in from the side, or hook the bender over installed pipe.

For additional data, ask for item T-1201, using the coupon on page 61.

Conduit bending methods subject of new folder

"How to bend rigid or thinwall conduit easily and accurately" is a new folder just published by Gustave Lidseen, Inc., 1000 First St., Hayesville, N. C. It illustrates the complete line of Lidseen "Chicago" pipe benders featuring the exclusive calibrated degree scale vital for making accurate repeat bends with ease.

Each model is fully described showing their capacities, performance data, and bending circles for rigid or thinwall conduit. Along with complete operating instructions is a typical example set up showing how easy the Lidseen "Chicago" bender enables even inexperienced operators to calculate lengths of legs and locate the bend. The example also covers two methods to make "back-to-back" bends and explains the easiest way to make an offset bend.

The folder, designated as Bulletin 556, includes prices of units and parts and features, exploded views with parts numbered for identification purpose.

For additional data, ask for item T-1202, using the coupon on page 61.

Expansion shield anchors for equipment mounting

A LINE OF expansion shield anchors is now available from Jordan Industries, Inc., 2751 N.W. 75th St., Miami 47, Fla. These anchors, designed for fastening equipment to plaster, cement, tile, brick, marble, wall board, etc., are available in three sizes designated as 101, 102, and 103.

The manufacturer reports that physical tests just completed by the Pittsburgh Testing Laboratory indicate that the anchors required the following maximum load (perpendicular) to pull out: #101 with #9 screw, 1,120 pounds; #102 with #14 screw, 2,226 pounds; and #103 with ¼-inch lag screw, 2,770 pounds.

For additional data, ask for item T-1203, using the coupon on page 61.

Mechanical installing tool for open-wire connections

MORE COMPRESSION connections can be made on open-wire distribution lines with a new type mechanical installing tool from the James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Mo.

Featured are individual, interchangeable, insert indenting dies lo-

cated near the fulcrum pins for maximum ease in compressing the fitting. The dies are snapped in or out of rectangular seats with the fingers,

without the aid of tools. They compress Squeezon tap connectors through line wire sizes 4/0 ACSR or stranded aluminum, and line splicing sleeves through 4/0 stranded aluminum or 2/0 ACSR and stranded copper.

A fixed die in the nose of the tool compresses service entrance sleeves and L-Taps. The tools are designated 0-51 and 0-52, differing only in the size of the fixed nose die.

For additional data, ask for item T-1204, using the coupon on page 61.

Single unit drive tool for flush mountings

A NEW SINGLE unit drive tool, the Hilti "JD", was developed to handle a complete new series of internal (female) threaded studs made for

flush mountings by Hilti Rapid Fastening Systems, Inc., 55 Vandam St., New York 13, N. Y.

Capable of cutting time and labor on most jobs in this category, the inexpensive Hilti "JD" works on the same foolproof hand-powered principle as other Hilti drive tools. The "JD" has many applications, but it has proved itself especially useful for fastening travers tracks, small clips, small channels and straps. It is ideal for picture hanging, power control systems, sheetmetal work and decorative fastenings.

For additional data, ask for item T-1205, using the coupon on page 61.

New hydraulic pipe bender makes bends in one setting

PIPE BENDS up to 90 degrees can be made in one setting of the pipe and one stroke of the ram with the new S-130 "One Set" hydraulic pipe bender introduced by Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee 46, Wis.

The S-130 has a bending frame, swivel and bending shoes made of rigid, lightweight aluminum for greater portability, easier assembly and maneuverability. Featured is a removable top plate that permits easy setting of the shoes and positioning of the pipe for bending. By removing the top plate, pipe can be simply inserted from the top and the bending job accomplished without the normal loss of time encountered with units that require sliding pipe in from the side. This feature is particularly advantageous when work must be done in congested areas where space is at a premium. The bender will work in any position—on the floor, on a table, or overhead on existing runs.

Also featured in the unit is the "Optik Angle Gauge", a new Black-

hawk exclusive, which permits the operator to have visual control of progress of the bend with every pump stroke. The gauge speeds making 180-degree bends, double offsets, compound and repeat bends. No tables, calculations, or measurements are required.

When mounted to a swivel shoe, the "Optik Angle Gauge" becomes an integral part of the bender. Readings from zero to 105 degrees are visible either through holes in the bending frame or on the exterior of the bender. Work can progress quickly, accurately, and without interruptions.

Six cast aluminum bending shoes handle, ½, ¾, 1, 1¼, 1½, and 2-inch diameter pipe or conduit. The shoes are simply set on the plunger and a lock pin dropped into place; no time-consuming threading of shoes on the ram is required. A remote-controlled hydraulic power unit gives the bender complete portability and versatility and can be used separately as a maintenance jack. For big jobs, an inexpensive motor-driven Blackhawk P-182 pump is available to speed work. Pipe and conduit can be bent in one-third the time with this quick-action pump.

Operating speed of the bender makes bending on the job highly economical by reducing the costs of cutting, threading, assembly and installation and by avoiding any need for factory-formed bends.

Sold as a complete set, the S-130 is packed in a sturdy wooden case.

For additional data, ask for item T-1206, using the coupon on page 61.

New type metal strap "snaps on" pipe, conduit

A NEW TYPE of metal strap that "snaps on" pipe, rigid and thinwall conduit is announced by Holub Industries, Inc., Sycamore, Ill.

It is claimed that this new strap permits neater, faster installations because it doesn't have to be held in place. Since it can't drop off, it is particularly good for overhead work, or hard-to-reach jobs. According to the manufacturer, further savings can be made by using these straps and spot welding for installation to steel frame work.

The secret of the "snap" is a bump inside the strap. As the strap is pressed on, the bump causes a slight springing action which holds the strap firmly in place. Ribbed construction adds to the snap and provides rigid support of the conduit or pipe.

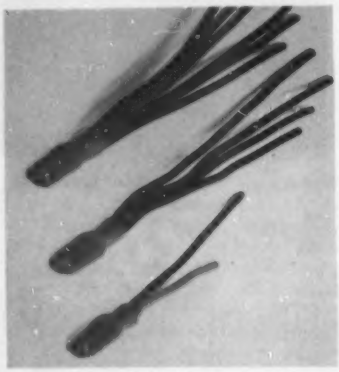
"Snap-On" straps are made of heavy gauge steel and zinc plated after fabrication. They are available in six sizes from ½" to 2" for thinwall conduit, and seven sizes from ⅜" to 2" for rigid conduit and pipe. The size is stamped on each strap.

For additional data, ask for item T-1207, using the coupon on page 61.

Spring type connector makes solderless one-step splices

A SPRING TYPE, electrical wire connector that makes solderless, ready-insulated splices in one step without tools has been made nationally available by Minnesota Mining and Manufacturing Co., Dept. D6-274, St. Paul, Minn.

Called the "Scotchlok" brand Type R connector, it is said to provide a vibration-resisting pig-tail splice that



holds regardless of thermal or mechanical changes.

Expected to be widely used by electrical contractors and for plant maintenance, the new connector is approved by Underwriter's Laboratories as meeting all requirements for high and low voltage building (1000 volts maximum) and fixture (600 volts maximum) wiring.

The new connector consists of a cone-shaped coil spring within a steel shell to prevent crushing in crowded junction boxes. The vinyl insulating jacket—molded over the unit—features a triangular cross-section for a better finger grip during application. It also includes a skirt at the bottom to protect the wires and prevent flashover.

In use, the new connector is simply screwed on the ends of the wires to be spliced—the cone-shaped spring construction providing threads and

Now you need only half the former space with General Electric's new 30 amp, 600 volt HCI safety switch!

This HCI safety switch, both heavy and standard duty, has a new compact design measuring only 7⅜" wide x 9⅜" high x 5⅜" deep! In less than half the former space, you get the same dependable protection and these important benefits:

Long life, dependable performance. G-E arc quenchers quickly divide and snuff out arcs, help prevent pitting and burning of contacts. Heavy steel box has Bonderite† corrosion-resistant finish and butt-hinged door for rugged durability.

Speedy installation and maintenance. Front operated handle makes close ganging easy with the heavy duty model; front fusing on both models means fast access to fuses, efficient heat dispersal. Double-break HCI pole units can be individually replaced.

Better protection, greater safety. Quick-make, quick-break contacts can't be teased in or out. Switch handle locks OFF or ON. When switch door is open, special line shield on heavy duty model guards operator against accidental contact with live parts. *General Electric Company, Circuit Protective Devices Department, Plainville, Conn.*

Use these catalog numbers to order 30 amp, 600 volt HCI switches from your G-E Distributor:

Type H, heavy duty, front operated, 3 pole*		Type S, standard duty, side operated, 3 pole*	
Fusible	No fuse	Fusible	No fuse
TC90361SD	TC45361SD	TC60361	TC30361

†Parker Rust Proof Co. *UL Listed

GENERAL ELECTRIC

gripping the wires firmly under constant tension.

It has been field-tested for more than a year, the manufacturer said, and has been used in several large new structures throughout the country.

The pre-insulated connector is suitable for use on wire sizes from #10 to #16 AWG in 64 possible combinations. A complete list of wire size combinations is printed on each box.

For additional data, ask for item T-1208, using the coupon on page 61.

Power pipe pushing described in manual

MERCURY Hydraulics, Inc., 2440 Blake St., Denver 5, Colo., has published a complete and authoritative booklet describing the techniques of power pipe pushing.

This manual, titled "Power Pipe Pushing", is used in conjunction with "Speed-Thru" hydraulic pipe pusher, but it is universally applicable. The described and illustrated methods shown can be used in connections, in most cases, with any type of pipe pusher, whether hand or power operated, and will prove extremely valuable to anyone concerned with underground pipe or conduit installations.

For additional data, ask for item T-1209, using the coupon on page 61.

New trenching machine for burying lighting circuits

THE NEW light weight Baby Ditch-Witch trenching machine, ideal for cutting narrow trenches for burying

lighting circuits, is announced by The Charles Machine Works, Perry, Okla. A 2-inch wide trench can be cut at any variable 2-inch depth to 18 inches deep by this new Model B which can be transported easily in any pickup. The unit is also built with a 12-inch bucket line.

Powered by a 2.5 hp engine, only 25 to 30 pounds manual pressure is required on the handle bars for an 8-inch trench in average soil, a trench of four to eight-foot length per minute will result.

In harder digging, the Model B may be pulled forward by a simple hand winch attached to the handle bars. The winch rope is attached to a stake at the end of the proposed trench and the operator winds up the rope at the desired speed.

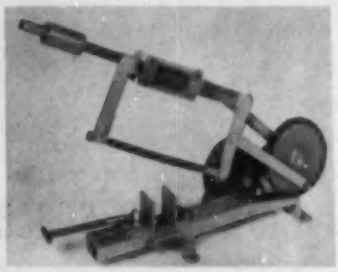
Weighing only 150 pounds and traveling on 2" x 10" semi-pneumatic tires, lawns are not damaged in the digging.

For additional data, ask for item T-1210, using the coupon on page 61.

New power saw makes debut

"IRON MIKE", a new 3½-inch power hacksaw, is now being introduced by the Arco Manufacturing Co., of Grand Forks, N. D.

Aptly called "Iron Mike" for its tireless, robot action, this new power



hacksaw ends tiresome hand sawing. It cuts everything up to and including three-inch steel pipe.

"Iron Mike" weighs only 16 pounds (without motor), and is constructed entirely of steel, using a chain drive for positive action.

"Iron Mike" works by itself automatically and unattended, making uniform straight cuts every time. It can be easily mounted on the Freeman Universal Motor Mount, quickly carried around to different jobs.

For additional data, ask for item T-1211, using the coupon on page 61.

Pin-Grip masonry anchors speed fastening time

FOR faster, more convenient fastening, Star Expansion, 142 Liberty St., New York 6, N. Y., has introduced the Pin-Grip, a one-piece masonry anchor. By merely driving the pin protruding from the head flush with the head, a permanent, tight fastening job will result.

To install a Pin-Grip, drill a hole in masonry (concrete, brick, cement or cinder block, etc.) with a masonry bit or a drill and hammer the diameter of the Pin-Grip. Insert the Pin-Grip through the fixture into the masonry hole. Drive the pin flush with the anchor head using an ordinary hammer. The stainless steel pin, nested in the bored aluminum body of the Pin-Grip, forces out four expanding prongs which grip the wall within the masonry hole.

Star's Pin-Grip masonry anchor is recommended for securing conduit clamps, electric cable straps, utility and junction boxes, fuse boxes, etc., to any kind of masonry. A wide range of sizes are available to meet every requirement.

For additional data, ask for item T-1213, using the coupon on page 61.

Stud welding standards available in booklet

A COMPLETE 36 page booklet on industry standards in arc welding studs, pins and tapped pads for stud welding has been published by KSM Products, Inc., Stud Welding Division, Merchantville 8, N. J.

The booklet is concise and easy to read. It contains a complete index and reference to equipment and accessories used in stud welding applications.

Each specification page lists size minimums and maximums. It details mechanical properties, chemistry, thread sizes, plating and annealing information and other data valuable to engineers, production and purchasing men.

For additional data, ask for item T-1214, using the coupon on page 61.

Quick method of joining smaller sizes ACSR

A NEW TOOL developed by Aluminum Company of America, 2307-W Alcoa Bldg., Pittsburgh 19, Pa., makes possible a quick, simple, cost-cutting technique for joining the smaller sizes of single core Aluminum Conductor Steel Reinforced (ACSR).

Plier-like in appearance, the tool easily forms hooks in the steel core of the more popular sizes of subtransmission and distribution ACSR. The cores then are hooked together

and clinched. An aluminum sleeve then is centered over the joint and compressed, completing a connection having a minimum of 95 per cent

of conductor strength and offering low electrical resistance.

The hook joining method eliminates the need for stocking and installing steel sleeves on the ACSR core. Costs are reduced considerably over the usual ACSR double-sleeve joint method, amounting to as much as 42 per cent in the case of #4 ACSR.

For additional data, ask for item T-1215, using the coupon on page 61.

New model Brunt faultfinder for energized power circuits

PARR Manufacturing Corp., 48 Hale St., Cranford, N. J., announces production of the new Model No. 58 Brunt faultfinder. . .described as "a

combination ground detector and fault locator for use on normally ungrounded power circuits while these circuits are energized".

The manufacturer states that it was especially designed for use in plants having several distribution centers of widely separated voltages and can be used on voltages from 120 volts to 600 volts. The new model is housed in a #16 gauge steel and aluminum cabinet with grey hammertone finish, 15" high, 8" wide, 7" deep. The weight is given as 27 pounds.

The manufacturer emphasizes that its pulsating, audible signal is clearly distinguishable from background plant noises. Its strength is such as to permit the use of the instrument on circuits buried in the earth or in concrete, or on overhead circuits, without the necessity of placing the exploring coil on the conduits or cables. Two other new models now available are the Portable Model No. 126 and the Standard Model No. 137.

For additional data, ask for item T-1216, using the coupon on page 61.

Metal and wood hole saws simplify conduit work

A VERY COMPLETE line of hole cutting saws for metal and wood is described in a catalog insert recently issued by Misener Mfg. Co., 202-8 Walton St., Syracuse 2, N.Y. The bulletin, designated as Form 756, lists complete single cut tools for cutting holes from ¾-inch to 15 inches in diameter, as well as replacement blades. The cutting blades are available for depth of cut from ¾-inch to 2 inches.

Of special interest to electricians is the Misener cutting tool 8P. This is a single tool which accomodates four different cutting blades designed to cut slip fit holes for pipe sizes 1", 1¼", 1½" and 2". The blades furnished with the tool will make cuts 2 inches deep. The blades furnished are non-shatterable coarse tooth blades for wood. The 8P tool is designed for bringing pipes through wood floor, partitions, etc.

Other combination tools for electricians are equipped with a range of metal cutting saws designed to give slip fit holes in metal boxes, etc., for common pipe sizes. A rotary ceiling saw is available for cutting openings just the right size for outlet boxes. A pan under the saw blade catches the cuttings as the tool operates.

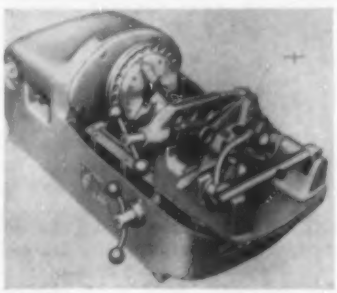
For additional data, ask for item T-1217, using the coupon on page 61.

New pipe and bolt threader features speed, light-weight

"SPEED-O-MATIC" is the name given to the new portable pipe and bolt machine from Beaver Pipe Tools, Inc., Warren, Ohio.

The "Speed-O-Matic" is a fast, rugged, powerful machine weighing only 170 pounds. It threads ⅛" to 2" pipe, ¼" to 2" bolts, up to 12" with a drive shaft. The new, improved, fully protected motor is said to give at least 50 per cent more speed. The recessed motor switch is fully protected.

The new Beaver Power-Grip wrenchless chuck is standard equip-



ment on the "Speed-O-Matic". Cutoff, dieheads, and reamer are all pivot mounted making the "Speed-O-Matic" an ideal make-up machine. The new "Clear-Vu" self-centering wheel-and-roller cutoff allows the operator to see the cut being made at all times.

A special oiling tube directs oil right to the threading dies. It shuts off automatically when moved out of position. A vane type, quick-acting, pulsating flow pump produces even distribution of oil to all die segments. Instant and accurate, easy-setting, spool type pipe support eliminates any double chucking.

Renewable bearings and easily accessible parts of the new Beaver "Speed-O-Matic" make for minimum upkeep and long life. The reamer is fast-cutting alloy-steel with three flutes.

The new "Speed-O-Matic" has the lathe-type thread length indicator located right before the operator's eyes. Carriage travel is a full 9 inches.

For additional data, ask for item T-1218, using the coupon on page 61.

New hammer drive tool for concrete fastenings

Now, the contractor or the handyman can fasten to concrete or steel with a hammer by using the new Omark hammer drive hand fastening

tool. The device requires no power source such as cartridges, electricity or air, and is made by Omark Industries, 5001 S. E. Johnson Creek Rd., Portland 6, Ore.

The tool concentrates the force of a hammer blow to the head of a special hardened steel drivepin making a fastening in seconds that previously required minutes by other methods. Can be used where powder actuated tool use is not feasible.

It is easy to use, requiring no special instructions or maintenance: a drivepin is inserted into the barrel of the tool from the bottom. A plastic washer holds the pin steady while it is being driven. A driving ram is pushed into the barrel from the top of the tool. The tool is then held securely against the receiving material while 2 or 3 hammer blows are struck on the driving ram head, which forces the drivepin into the concrete. The plastic washer disintegrates at the last hammer blow leaving a clean fastening.

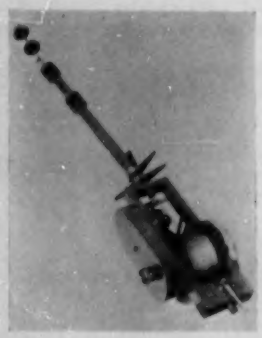
The Omark hammer drive tool is

used for light fastening to concrete, masonry, concrete or cinder block and mild steel. The special ballistic point design of the drivepin assures easy penetration and a firmly seated fastening. Four types of drivepins in more than 30 sizes are available.

For additional data, ask for item T-1219, using the coupon on page 61.

Cope pneumatic fishline simplifies cable jobs

AVAILABLE from T. J. Cope, Inc., Collegeville 12, Pa., is a pneumatic fishline which permits fishing of wires through underground conduit in minutes. This fishline consists of a powerful air gun that uses conduit for its barrel and operates at full



power and efficiency regardless of conduit diameter or length.

This is part of a complete line of special tools and devices designed to help solve underground cable installation problems. The line includes conduit rods, rod pullers, mandrels, jar hammers, wire brush cleaners, cable pulling heads and rigging, etc.

For additional data, ask for item T-1220, using the coupon on page 61.

New portable threader features power control

COLLINS Machinery Corp., 5474 Alhambra Ave., Los Angeles 32, Calif., is introducing a newly designed

Thred-O-Matic "22" portable pipe, conduit and bolt threader and cutter as a successor to the Chief threader.

The Thred-O-Matic "22", with its automatic, power-operated double chuck, is the ultimate in threading and cutting automation. It offers record-breaking speed in threading pipe or conduit from ⅛-inch to two inches and bolts from ¼ to 1½ inches, and the lightness and sturdiness of modern aluminum alloys.

Emerson, Johnson, Mackay, Inc., Los Angeles industrial designers, incorporated many new features in the Thred-O-Matic's design: a sliding extension bar makes it easy to break tight fittings; pipe is guided into the spindle by the funnel-shaped design of the rear cover, and the tool tray on top of the housing offers greater working convenience and efficiency. The spindle bearings are lubricated by a continual feed of oil from individual reservoirs.

For additional data, ask for item T-1221, using the coupon on page 61.

Fluorescent tube changer provides ease and safety

A LABOR-SAVING tool has been marketed by Pattern Products Co., P. O. Box 135, Union, N. J., that will make the workday of every maintenance

man easier and safer. Fluorescent tube maintenance in the past involved lugging heavy, clumsy ladders around the plant.

The new fluorescent tube changer makes this method obsolete. Instead, the maintenance man needs only to raise the lightweight tube changer up to the fixture while he stands on the floor beneath it. He simply twists the handle, and the burned-out tube is quickly removed from the fixture. By reversing the procedure, a bright new tube is shining minutes later.

The all-aluminum Model No. 200 can be used as a 4' or 8' unit and can reach up to fixtures as high as 15' above the floor. It will change fluorescent tubes on any standard fixture, including the push-type fixture. Furthermore, its 2-piece design allows the tube changer to be stored in any small space.

For additional data, ask for item T-1222, using the coupon on page 61.

Compact hole saw kit in sturdy metal box

A NEW hole saw kit specially designed to meet the electrician's needs is now being produced by The Henry

G. Thompson & Son Co., of New Haven, Conn., manufacturers of Milford metal cutting saw blades.

The kit consists of six Milford welded edge high speed steel hole saws ranging from ⅞" to 2½" in diameter and providing standard entrance sizes for pipe from ¾" to 2" in diameter. There are also 3 arbors (including one of the follow-through type) and a 12" extension. The entire kit is contained in a compact, sturdy box of heavy gage metal; space is provided for several spare hole saws.

For additional data, ask for item T-1223, using the coupon on page 61.

Economical stud driver for light duty fastenings

THE "Rap-It" stud driver by Fastening Devices, Inc., 369 50th St., Brooklyn 20, N. Y., is a hand tool of simple, rugged design that sets

low cost fastenings in concrete, brick, or steel safely and effectively with the aid of a hammer. A single plunger, self-centering tool, it sets any size stud or drive-pin up to 4" long.

All that is needed for any light fastening job is the stud driver, stud or drive-pin, and a 2½-lb. hammer. For contractors, maintenance men and other trades, the tool performs at low cost because it completely eliminates drilling holes, when applying anchors.

A wide line of studs, drive pins, couplings, hex nuts, acorn nuts,

Only the finest!

JACKSON, through the years, has used only the finest in top quality parts and materials. That's why, when it came to choosing an insulating material for JACKSON Water Heaters, Fiberglas was the winner. Fiberglas — the finest insulating material made by man!

Efficient, non-corrosive, sanitary, moisture-resistant, non-combustible and resilient, Fiberglas does not shrink, expand or warp!

And it's lighter — saves many dollars in shipping costs alone!

It's the finest insulation and — naturally — JACKSON uses it! Another example of JACKSON'S careful quality control.

For information on the COMPLETE line of JACKSON Gas and Electric Water Heaters contact your Jobber.

W. L. JACKSON MANUFACTURING COMPANY
1222 EAST 40TH STREET CHATTANOOGA 7, TENN.

washers, bridle rings, etc., can be furnished. Also available are an accessory safety handle and a fixture for fastening pipe clamps, metal moulding, and partition channels.

For additional data, ask for item T-1224, using the coupon on page 61.

Portable A-Frame handles two tons

THE Magic-Pole A-Frame from B. E. Wallace Products Co., Exton 20, Pa., is a practical, adjustable height "skyhook" for supporting hoists at many places, indoors and out, where adequate means for bolstering the load are unavailable. The standard

model handles 4000 lbs., has a working height of 10 feet, yet weighs just 43 lbs., complete with guy line.

Both legs fold together, then telescope to a length of 6½ ft., for easy storage and handling. Each leg extends to the required length by 6-inch steps. The guy line is included as standard equipment, and may be secured to any convenient post, tree, pipe, truck, etc.

The adjustable leg length permits setup on ramps, sloping ground or other difficult places without "digging in" the uphill leg.

A special screw in type "spike" at the base prevents slip and permits setups on concrete, wood block, asphalt, soil or gravel. It is quite practical to mount in a truck bed for loading and unloading.

Also the guy line can be lengthened or shortened, by which means loads can be shifted 3 feet and more.

For additional data, ask for item T-1225, using the coupon on page 61.

Push-button propane torch with jet blast flame

SOMETHING NEW in push-button magic made its debut at the National Hardware Show at the New York Coliseum recently. It's the new giant push-button propane torch with jet blast flame, product of the Otto Bernz Co., of Rochester, N. Y., pioneer manufacturer of propane gas appliances, including the Bernz-O-Matic torch.

The new torch, using the same self-sealing, propane gas-filled cylinder as its sister appliances, differs in appearance from the standard Bernz-O-Matic torch only in the larger size of the burner, the push-button valve and knob. The burner shield on the new item is three inches long and one full inch in diameter. Therefore, it produces a much larger flame which maintains a consistent maximum temperature of 2010-2050 degrees F.

Operating on a push-button principle, the flame of the trigger torch is ignited by a steady-burning pilot light, thus eliminating the necessity of burning the larger flame at all times after the first lighting, and conserving fuel while not in actual use.

The new torch can do anything the standard Bernz-O-Matic can do, but because of its larger burner and flame, is destined for even more comprehensive usage.

For additional data, ask for item T-1226, using the coupon on page 61.

Portable pipe threader performs variety of jobs

THE Lawco Jr. portable pipe threader, marketed by Velocity Power Tool Co., 201 N. Braddock Ave., Pittsburgh 8, Pa., weighs only 20 pounds and measures less than 27 inches in length. In addition to pulling heavy cables through conduit, the electrically-powered Lawco tool is used to thread conduit ends for anchoring in terminal boxes.

Proving its versatility, the Lawco Jr. recently fished four 4/0 cables through 165 feet of 2½-inch conduit having two 90-degree bends in ¼ man-hours. If done by the usual methods, the project would probably have taken four or five man-hours.

To accomplish this, the wire rope from the winch reel was fished or pulled through the conduit and a "Chinese puzzle" cable gripper was attached to the cable. The threader was mounted on the conduit through which the electrical cables were to be pulled, and the wire rope was fed over a snatch block chained to an overhead beam in order that a direct pull could be made through the conduit. Two electricians fed the cables into one end of the conduit and a third operated the power unit on the other end.

The Lawco equipment can also be used as an auger for cutting channels for cable installation, and as a winch for hoisting heavy terminal boxes and other equipment into position.

The unit can be plugged into any convenient 110-volt circuit. It can be carried by one man from one location to another. Because of its size and weight, it can be operated with one hand if necessary.

For additional data, ask for item T-1227, using the coupon on page 61.

Quick-connect terminal kit speeds appliance servicing

A NEW TOOL that will perform all the varied operations formerly done by the two previous crimping pliers is a feature of the new Quick-connect terminal kit from Ark-Les Switch Corp., 51 Water St., Watertown 72, Mass. The powerful jaws of

this new terminal-crimping, wire-stripping tool assure a tight, low-resistance contact between wire and terminal. This one tool is used for connecting flag-type, bullet-type, and in-line terminals as well as stripping insulation and cutting wire.

In addition to the new crimping pliers, the kit contains an assortment of five types of male and female flag-type and in-line Quick-connect terminals, bullet-type terminals, insulated line connectors, and four styles of terminal adapters, all in a compact steel carrying case. The Quick-connect terminals simplify rapid, efficient servicing of electrical appliances and automotive wiring. The line connectors provide means for connecting in-line terminals within an insulating sleeve. The terminal adapters permit servicing wiring harnesses that are assembled with bullet-type terminals.

For additional data, ask for item T-1228, using the coupon on page 61.

Field testing earth anchor with Traction Dynamometer

AN INEXPENSIVE yet highly accurate field test of earth anchors has been announced by W. C. Dillon & Co., P. O. Box 3008, Van Nuys, Calif. This method employs a Traction Dynamometer as the measuring device. In testing, an anchor with expanding blades was set in the ground at a depth of approximately six feet. To determine the holding power of the anchor under test, a steel rod was attached to it in series with a Dillon Dynamometer. Swivel connections between the anchor rod and Dynamometer maintained alignment of force even though the anchor might twist. Load was applied to a steel cross beam with a screw-jack until the anchor pulled loose. Amount of force applied was instantly indicated in pounds by the Dynamometer.

For additional data, ask for item T-1229, using the coupon on page 61.

FAEC convention boasts record attendance

◆ ONE COULD SAFELY summarize the Florida Association of Electrical Contractors Annual Convention and Electrical Trade Show at Miami Beach by stating the theme, carefully woven through the four-day program: "How to Create and Retain Profit". . . with a concluding dash of: "The Florida Electrical Contractors Future."

It was by far the largest turnout of electrical contractors, and their guests, in FAEC history. . . and, as a result, it was a very successful conference. The electrical show was something everyone will remember for a long time to come . . . complete, interesting and patronized like no other Florida Electrical Show was ever patronized.

It was a banner 4-day period for the FAEC Convention Committee. . .ably directed by Jim Dandelake. . .and a crowning culmination for the FAEC Officers who guided the destiny of the association, and it's state-wide activities, for the past year: Howard L. Palmer, president (Palmer Electric-Orlando); R. H. Palmer, Jr., first vice-president (Palmer Electric-Lake Worth); James Dandelake, second vice-president (Miller Electric-Jacksonville); and Howard A. Lilly, secretary-treasurer (Tampa Armature-Tampa).

The 4-day meeting developed into an interesting combination of formal and informal programs with a healthy sprinkling of discussion huddles interspersed between sessions. Facts were given. Questions were asked. Answers were given and possible solutions to problems freely offered. Everyone benefited.

Problem of overhead

It all started, on the first day of the convention, with: "It's Your Money" by Dr. J. E. Royer, professor of accounting and assistant dean of the School of Business Administration of the University of Miami. His discussion developed into a modern approach to accounting importance as well as an analysis of overhead and job costs . . .."alley-cats" that haunt the business life of every electrical contractor. Professor Royer convinced contractors that even though he recommended two methods to apportion overhead the only way they can avoid old-man overhead entirely is to quit business!

This important beginning was followed by a timely panel discussion: "Who Carries Who?" moderated by Harry Krebs, district financial manager of Graybar Electric. . .who explored plenty of new, forward thinking on jobber-contractor finance with the able assistance of panelists: G. J. Brown, credit manager, General Electric Supply, and H. A. Pattrill, secretary - treasurer of Hughes Supply.

"New Laws Will Affect You," by Walter E. Engle, pointed up a lot of important news on pending legislation and showed how it will affect the pocketbooks of Florida electrical contractors.

Wes Olson, Daytona Beach contractor, followed the coffee break with "Is 'Materials-on-Site' Hurting You?". . .and a convincing, thorough talk on a program developed by Mr. Olsen to put "material dollars" back in your pocketbook.

A brand new and interesting presentation of the National Electrical Manufacturers Association: "Heat Your Home Electrically" . . . narrated by H. R. Holzclaw ended the "open meetings" of the first day.

An electrical contracting panel, moderated by Howard L. Palmer, followed. This open-minded, down to earth panel discussion of electrical contractors present - day problems enabled the audience to direct any type of question to a powerful panel consisting of Vince Burkhardt, Jim Dandelake, Jim Lowry, Axel Ornberg, Norwood Hope and Jim Ward.

Estimating profit

The second day was a day devoted entirely to "profit," starting, as it did, with the General Electric Lamp Division's "Planning for Profits". This complete, interesting and informative presentation included the things that are new in all fields of lighting-for profit, and was followed by a moderated panel discussion, "Electrical Estimating Panel". General discussions and audience questions on estimating for profit covered the following valuable fields: heavy construction. . .light commercial construction. . .residential wiring . . .the ten-dollar job. . .service call charges. . .estimators tools . .moderated by Jim Dandelake with panelists, Al Ralston, John Meyers, Dick Ogden and Dick Quinby.

After the invocation and third-day welcome address, a panel discussion: "Contractor-Jobber-Manufacturer Forum", moderated by J. Arthur Turner started the day's valuable subjects. The panelists included D. H. Nickell and Walter J. Barnes for the manufacturers; Gordon C. Cutler and Day Harper for the distributors; and Vince Burkhardt and Axel Ornberg for the contractors.

Oliver Burnett, president of the National Electrical Contractors Association, made an impressive talk on: "Why My Company Needed a Trade Association". He also said "his competitors were his greatest asset, as they control how much money he could make. Through the trade association is the only way to improve this relationship and improve profits for all".

The next speaker on the agenda was Vernon C. Holloway, who flew to Miami with last minute news on the "New 1956 National Electric Code". . .released for the first time at the International Association of Electrical Inspectors Convention, the day before, in Dallas, Texas. Enough copies of the "Analysis of 1956 Revisions of National Electric Code" were brought to Miami, so that each member present received a copy for his use. This was followed by a question and answer period on the National Electric Code.

"Tool Efficiency for Electrical Contractors" followed. A brand new instructive color movie, made in Florida and presented by the Miller Electric Company, completed the days program.

The fourth, and final, day started with a morning of reports: reports from each officer, the state manager, and standing committees.

(Continued on page 84)

Know the law

by Arthur L. H. Street

When contractor bids for subcontract work

◆ A GENERAL CONTRACTOR is about to bid for a construction contract which involves extensive electrical work. He asks an electrical contractor to give him figures showing the price at which the latter will be willing to furnish the labor and materials required by the specifications of the general contractor. As the lowest responsible bidder, the general contractor gets the prime contract, but lets the subcontract for the electrical work to another electrical contractor. Does *the mere fact that the general contractor used the first electrical contractor's figures* entitle the latter to sue for damages?

It is probable that in any state where this question may arise the question would be answered no. This is indicated by a recent decision reached by the Washington Supreme Court in the case of Milone & Tucci, Inc. v. Bona Fide Builders, Inc., 301 Pacific Reporter, 2nd Series, 759. There the subcontract did not involve electrical work, but the reasoning of the court would necessarily apply to that, or any other kind of, subcontract work.

The essential facts of the case were as follows:

Plaintiff, subcontractor, furnished to several prospective bidders for a prime contract figures at which plaintiff offered to furnish labor and materials. This preparation involved about $215 expense. Defendant was awarded the contract as lowest bidder. But, although he used plantiff's figures, that did not make him the lowest bidder for other bidders bid less on the particular subcontract work than the figures furnished by plaintiff to defendant and used by the latter. Defendant was low bidder for the entire job.

Legal factors

The decisive legal factors in the case were these: Plaintiff went to the trouble end expense involved on the *chance* that it would get the subcontract. It made identical *offers* to other bidders, as well as defendant, without assurance from any of them that a subcontract would be awarded to plaintiff.

There was no claim that defendant had explicitly agreed that if it won the prime contract through use of plaintiff's figures it would award plaintiff the subcontract at those figures. Nor does there seem to have been any argument by plaintiff that it would have been bound to take the subcontract at those figures, regardless of whether labor or material costs should go up in the meantime.

Plaintiff's lawyers merely claimed that, although there was no agreement by defendant to award the subcontract to plaintiff, defendant had no right to enrich itself by securing a profitable prime contract through use of plaintiff's figures. But the Supreme Court, as above noted, relied upon the facts that those figures did not make the general contractor the low bidder, that the figures were also furnished to the other bidders, and that it was clear that plaintiff willingly took chances on winning a subcontract.

Possibly, but not necessarily, had plaintiff furnished the figures to defendant alone and if use of those figures had made the general contractor low bidder, the court would have decided in plaintiff's favor.

Memorandum forms

How could plaintiff have protected itself against what happened? By attaching legal strings to the offer it made to defendant. In other words, if plaintiff was not willing to run the risk of not getting the subcontract, it should have made that clear in writing before, or in, submitting its figures. No particular wording was required. If plaintiff had been asked to submit figures, or if it desired to initiate negotiations, it could have signed some such memorandum as follows: "Date, ———. On condition that if you are awarded the prime contract on the ——— project you will award us a subcontract for the furnishing of labor and materials for the work of ———————, at the price and on the terms to be set forth in our written offer, we will make an offer on which you may base your bid for the prime contract.— ———————— Condition accepted, ———, ——, 1957 ————————."

To such form might be added, if so desired, a clause to this effect: "If you should elect not to award the subcontract to us, you are to pay us ——— dollars as compensation for use of our figures in your bidding for the prime contract."

Or the figures might be furnished the general contractor for use in his bidding under a memorandum not requiring the general contractor to pay for such use, but giving the subcontractor an *option* to take the subcontract covered by the offer to furnish figures, at those figures. (Many general contractors might regard this as giving the subcontractor too much advantage, just as subcontractors are apt to balk at furnishing figures without any assurance of being awarded a subcontract.)

Contract requirements

The problems involved arise from the ABC rule of law that there can be no valid contract if both parties are not bound. Ordinarily, a general contractor cannot bind himself in advance to give an electrical contractor a subcontract unless the electrical contractor is bound to take it, or for a valuable consideration—furnishing figures for binding — has an option to take it.

If there is no binding contract to give or take a subcontract, and the electrical contractor is unwilling to run the risk of not getting the subcontract, he has but one choice — not to furnish the figures or to exact an agreement that he is to be paid a certain sum for preparing and furnishing the figures.

To minimize risk of disputes that may later involve litigation, the figures furnished the general contractor should clearly show just

(Continued on page 82)

SQUEEZED like an accordion even to the point of edge rupture . . . yet, there is no opening of the welded seam.

FLARED while cold during a cone test. Note the weld. There's not a single indication of a break.

FLATTENED like a pancake—actually creased along the weld. But, look at the weld—still unbroken, and as good as ever.

EXPANDED 25% and flared. If weld flaws existed, this test would find them. But look at it—still strong as ever.

Four-way "torture" tests fail to break the weld on Rome's improved EMT

The purpose of these tests was to prove the strength of a Rome weld. But you can see by the unretouched photographs above that the weld on Rome's EMT just won't break.

In these punishing factory tests, Rome's EMT was squeezed, flared, flattened, and expanded. In each case, the weld was proved to be as strong as the metal itself.

And Rome's EMT offers you much more in addition to high weld strength. You also get these *other* important benefits:

Easy bending. Its strength interferes in no way with Rome EMT's uniform ductility. You can now make even intricate bends easily.

Outstanding fishability. The new slick mirror-smooth inside finish makes Rome's EMT easier and quicker to fish than *any other EMT* you can buy. This means you can wire up your installations much faster.

Corrosion resistance. A uniformly electrogalvanized exterior finish protects your installation against corrosion. Long dependable service life is assured.

This exceptionally durable and sturdy tubing exceeds all standards for thinwall raceways and has full Underwriters' approval.

A free sample of Rome's EMT is yours upon request. Test it and prove to yourself that Rome is your best choice for your next EMT job. Contact your nearest Rome Cable representative—or write to Department 900-B, Rome Cable Corporation, Rome, New York.

ROME CABLE
CORPORATION

New, revised estimating tables continued in this issue

A NEW SERIES of estimating tables, completely revised in the light of more recent jobs and experience, are presented in this issue and will appear from month to month in forthcoming issues. These electrical estimating data sheets cover labor only and are arranged alphabetically with the basic material headings as a title for each tabulation.

Labor units given in these tabulations are based on a minimum of interference during work progress. The averages listed do not provide for abnormal job conditions, and any such abnormal conditions will require adjustments by the user, based on his experience.

The work units covered by each table are composed of one or more separate but closely related operations necessary for the complete installation of a particular basic item of electrical equipment. These operations associated with the basic material are described at the bottom of each table.

Most of the electrical estimating tabulations follow the same form. Column 1 at the left shows the size of the material to be installed. The second column from the left gives the time required to install the material, and it should be noted especially that this "productivity" column may be based on individual units or in the case of cable or conduit on units of 100 feet or 1,000 feet. The abbreviations "Ea." for each, "C" for hundreds, and "M" for thousands in Column 2 indicate the basis of the labor hours.

Columns 3 to 13, from the left, give the actual labor costs in dollars per unit of installation, at various hourly wage rates.

When calculations are being made for an hourly wage rate that doesn't correspond to any of the rates listed in Columns 3 to 13, the user may multiply the number of hours in Column 2 by 100 and this will give the labor cost based on an hourly wage rate of $1 per hour. By multiplying this by the hourly wage rate that actually applies in the user's locality, the exact labor cost of the operation may be obtained. Labor costs obtained in this way will be for units, hundreds of feet, etc., as given in heading of Column 2 of the table.

The labor units covered by the tables represent direct job labor costs and do not include delivery of material to site, engineering, estimating, or any other indirect cost.

As will be noted, some of the electrical estimating tabulations to be given will be for independent operations, such as excavating, backfilling, etc. These are included for use in preparing estimates on work of a special nature not covered under a specific table heading.

Tables will appear in alphabetical order.

UNDERGROUND CABLE (STEEL SHEATHED)

TWO CONDUCTOR

OPEN TRENCH WORK

CABLE SIZE	HOURS "M"	LABOR COST INSTALLED PER FT. AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
12	4.4	.006	.007	.008	.009	.01	.011	.012	.013	.014	.015	.017
10	6.8	.009	.01	.012	.014	.015	.017	.019	.02	.022	.024	.026
8	7.9	.01	.012	.014	.016	.018	.02	.022	.024	.026	.028	.03
6	10.9	.014	.016	.019	.022	.025	.027	.03	.033	.035	.038	.041
4	14.1	.018	.021	.025	.028	.032	.035	.039	.042	.046	.049	.053
2	19.7	.025	.03	.035	.039	.044	.049	.054	.059	.064	.069	.074
1	21.8	.027	.033	.038	.044	.049	.055	.06	.065	.071	.076	.082
1/0	25.2	.032	.038	.044	.05	.057	.063	.069	.076	.082	.088	.095
2/0	28.7	.036	.043	.05	.057	.065	.072	.079	.086	.093	.10	.11
3/0	32.1	.04	.048	.056	.064	.072	.08	.088	.096	.104	.112	.12
4/0	37.5	.047	.056	.066	.075	.084	.094	.103	.113	.122	.131	.141
		THREE CONDUCTOR										
12	5.2	.007	.008	.009	.01	.012	.013	.014	.016	.017	.018	.02
10	8.3	.01	.013	.015	.017	.019	.021	.023	.025	.027	.029	.031
8	9.6	.012	.014	.017	.019	.022	.024	.026	.029	.031	.034	.036
6	13.5	.017	.02	.024	.027	.03	.034	.037	.041	.044	.047	.051
4	17.5	.022	.026	.031	.035	.039	.044	.048	.053	.057	.061	.066
2	24.6	.031	.037	.043	.049	.055	.062	.068	.074	.08	.086	.092
1	27.5	.034	.041	.048	.055	.062	.069	.076	.083	.089	.097	.103
1/0	32.2	.04	.048	.056	.064	.072	.081	.089	.097	.105	.113	.121
2/0	36.9	.046	.055	.065	.074	.083	.092	.101	.111	.12	.129	.138
3/0	41.6	.052	.062	.073	.083	.094	.104	.114	.125	.135	.146	.156
4/0	49.0	.061	.074	.086	.098	.11	.123	.135	.147	.159	.172	.184

C-102-B

LABOR: INCLUDES SETTING UP REELS, LAYING CABLE, AND CONNECTING AT ENDS.

12-56

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Electrical South Data Sheets — Series III — Electrical Estimating

UNDERGROUND CABLE (NON-METALIC)
THREE CONDUCTOR

OPEN TRENCH WORK

CABLE SIZE	HRS. "M"	LABOR COST INSTALLED PER FT AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
12	5.3	.004	.005	.006	.007	.0076	.008	.009	.01	.011	.0116	.012
10	5.2	.007	.008	.009	.01	.012	.013	.014	.016	.0165	.018	.02
8	6.1	.008	.009	.011	.012	.014	.015	.017	.018	.020	.022	.023
6	8.6	.011	.013	.015	.017	.019	.022	.024	.026	.028	.03	.032
4	11.	.014	.017	.019	.022	.025	.028	.03	.033	.036	.039	.041
2	15.7	.02	.024	.027	.031	.035	.039	.043	.047	.051	.055	.059
1	17.5	.02	.026	.031	.036	.039	.044	.048	.053	.057	.061	.066
1/0	20.4	.026	.031	.036	.041	.046	.051	.056	.061	.066	.071	.077
2/0	23.4	.029	.036	.041	.047	.053	.059	.064	.07	.076	.082	.088
3/0	26.5	.033	.04	.046	.053	.06	.066	.073	.08	.086	.093	.099
4/0	31.1	.039	.047	.0644	.062	.07	.078	.086	.095	.101	.109	.117

E-101-B

LABOR: Includes; setting up reels, laying cable and connecting at ends.

12-56

Electrical Estimating—III

LEAD SHEATHED CABLE (IN CONDUIT)
ONE CONDUCTOR

NO. OF CABLES PULLED, 1 & 2

CABLE SIZE	HOURS PER M FT.	LABOR COST INSTALLED PER FT. AT FOLLOWING RATES										
		$1.25	$1.50	$1.75	$2.00	$2.25	$2.50	$2.75	$3.00	$3.25	$3.50	$3.75
12	6.1	.008	.009	.011	.012	.014	.015	.017	.018	.02	.022	.023
10	9.5	.012	.014	.017	.019	.021	.024	.026	.029	.031	.033	.036
8	11.1	.014	.017	.019	.022	.025	.028	.031	.033	.036	.039	.042
6	15.3	.019	.023	.027	.031	.034	.038	.042	.046	.05	.054	.057
4	19.5	.024	.029	.034	.039	.044	.049	.054	.059	.063	.068	.073
2	27.5	.034	.041	.048	.055	.062	.069	.076	.083	.089	.096	.103
1	30.4	.038	.046	.053	.061	.068	.076	.084	.091	.099	.106	.114
1/0	35.3	.044	.053	.062	.071	.079	.088	.097	.106	.115	.124	.132
2/0	40.2	.05	.06	.07	.08	.09	.101	.111	.121	.131	.141	.151
3/0	44.9	.056	.067	.079	.09	.101	.112	.125	.135	.146	.157	.168
4/0	52.5	.066	.079	.092	.105	.118	.131	.144	.158	.171	.184	.197
250 MCM	58.0	.073	.087	.102	.116	.131	.145	.16	.174	.189	.203	.218
300 "	65.2	.082	.098	.114	.13	.147	.163	.179	.196	.212	.228	.245
350 "	71.0	.089	.107	.124	.142	.16	.178	.195	.213	.231	.249	.266
400 "	76.7	.096	.115	.134	.153	.173	.192	.211	.23	.249	.268	.288
500 "	86.4	.108	.13	.151	.173	.194	.216	.238	.259	.281	.302	.324
600 "	94.4	.118	.142	.165	.189	.212	.236	.26	.283	.307	.33	.354
700 "	101.9	.127	.153	.178	.204	.229	.255	.28	.306	.331	.357	.382
750 "	105.4	.132	.158	.184	.211	.237	.264	.29	.316	.345	.369	.395
800 "	109.0	.136	.164	.191	.218	.245	.273	.30	.327	.354	.382	.409
900 "	114.6	.143	.172	.201	.229	.258	.287	.315	.344	.372	.401	.43
1000 "	120.5	.151	.181	.211	.241	.271	.301	.331	.362	.392	.422	.452

E-101-B

LABOR: Includes preparation time, installing pull wire on runs of 75 ft. and under, setting up reels, pulling cable. (Does not include making up joints, racking in underground vaults or installing fittings at ends of cables larger than No. 2.)

12-56

Electrical Estimating—III

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Look!

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New, Revolutionary SOCKET METER TROUGH Design by B & C

Completely Eliminates Extra Cost and Installation Bother of the Sealing Ring

Available in steel or aluminum . . . single sockets or gang units for both vertical and horizontal mounting . . . with or without buses and disconnects . . . 5th and 6th terminals available.

Patents Pending

Only 3 Quick Installation Steps

1. Insert meter in jaws!
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3. Swing bottom latch over cover tab and seal!

Simplified Construction!

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- ★ Easier to Install and Maintain!
- ★ Unexcelled Performance!
- ★ Ample Knockouts!

All terminals are 4/0 capacity Hinge-Type, high strength copper. The unique PRESSURE PLATE design is adjustable from #8 wire size to 4/0 cable. The 45° angle of the terminal lugs eliminate sharp bends of the wire. The Hinge feature provides simple, easy conductor entrance and maximum connection security.

Positive corrosion protection . . . grey hammertone enamel is baked on over special chemical coatings for both steel and aluminum enclosures.

This new B&C design is undoubtedly the finest METER TROUGH ever made . . . it truly deserves your most careful consideration for any type of installation. One of the big features is *plenty of wiring space* . . . the single units are 8" x 8" x 3½" . . . the multiple units are on 8" centers both horizontally and vertically. All conduit hubs are interchangeable on standard openings of 1¼", 1½", and 2" and 2½". Interchangeable 1" openings are available if required. Hubs may be ordered separately.

Write for descriptive catalog containing installation data and price list.

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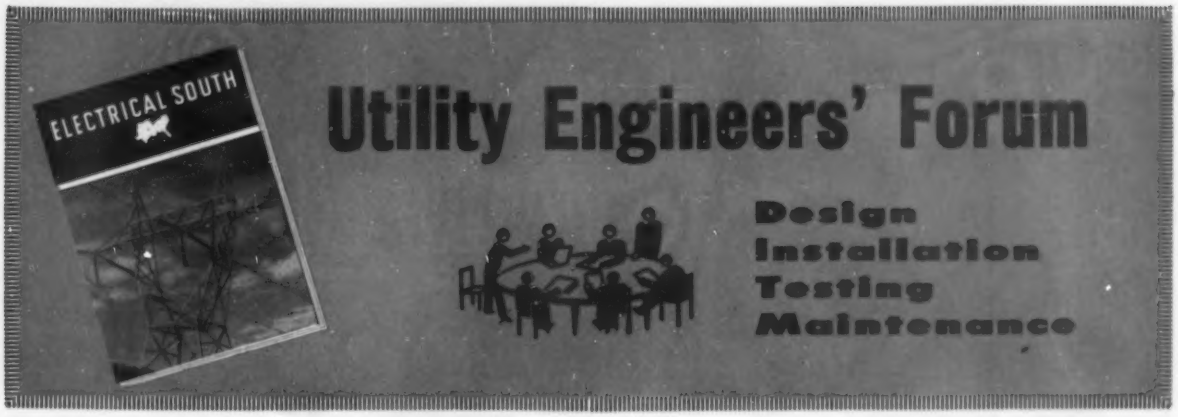

Are capacitors economically justified on UG networks?

Capacitors have proved their value on overhead distribution systems but, as this experienced distribution engineer points out, their economic justification on underground network systems is open to question except in a few special instances.

By F. G. Hamner, Distribution Planning Engineer, Southern Services, Inc., Birmingham, Ala.

◆ MANY EXCELLENT papers on this general subject have appeared in the trade magazines over the past five or ten years. Practically all of these papers glorify the use of capacitors in the secondary network systems so that it is almost the universal feeling that to put in these capacitors is to prove one's competency as a system designer. This paper does not attempt to prove quantitatively any of these articles to be wrong, but merely reviews seven of the premises on which most of the papers are based, and suggests that perhaps some of the accepted assumptions are not entirely proper.

(1) Savings in transformer kva. The contentions to be made under this head are such that those who care not to see, will not see. A 500 kva 12,000 volt primary network transformer of Type A will cost about $9,000. With the network protector it will cost about $12,000 which corresponds to $30.00 per kw of name plate capacity for an 80% P. F. load of 400 kw. The value of 75 kw of transformer and network protector is therefore $30 × 75 = $2,250. By installing 200 rkva of network capacitors this unit could carry 475 kw of load at 95% P. F. The cost of this 200 rkva will be about $25 per rkva or $5,000 so that the capacitor cost is slightly more than double the transformer and protector cost for 75 kw.

To correct our load to 90% will require 120 rkva. The 50 kw increased loading thereby allowed will cost 120 × $25 or $3,000 for capacitors while the corresponding cost for transformer kw is $30 for 50 kw making the cost $1,500. Again the cost of the capacitors is twice the cost of the transformer and protector.

It therefore behooves the advocate of the capacitors to seek further advantages for the capacitors and the first thing he latches on to is the idea of giving the capacitor a "free ride" insofar as the cost of vault space is concerned. This is done by adding the cost of the vault to the cost of the transformer and protector. This usually results in a cost per kw about equal to what it costs to provide a kw of increased permissible loading by use of capacitors, and it is on this basis that practically all of network capacitors are "justified." This manipulation is criticized as follows.

(2) Cost of vault space. The joint EEI-NEMA Committee spent much time and effort in carrying out an investigation to determine the economical dimensions of the standard network transformer. Various shapes were studied before the final design was agreed upon. The shape and size of the optimum vault is entirely adequate for the standard transformer, but no space in such vaults can be allotted to capacitor units without increasing its size. If, therefore, a utility wishes to install capacitors in its underground vaults more space must be provided at an increase in the cost of construction.

It is not, therefore, proper for those advocates of secondary network capacitors to ignore the cost of the vault space occupied by the

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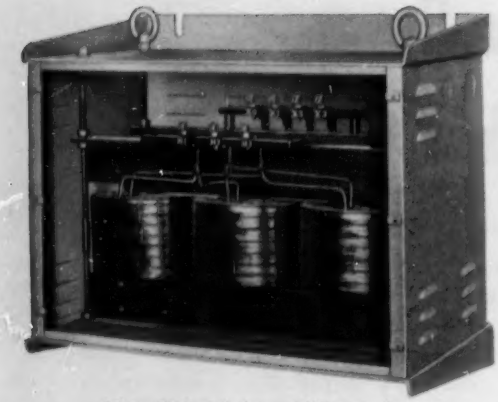
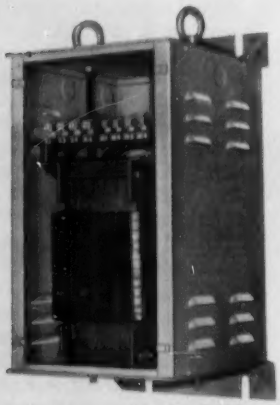
This article is adapted from an address before a recent meeting of the Engineering and Operation Section of the Southeastern Electric Exchange.

SORGEL dry-type transformers are *really different!*

They are not just ordinary transformers



15 to 50 Kva 3-phase. Wall mounting. Connection compartment panel removed



20 to 75 Kva single phase. Wall mounting. Connection compartment panel removed

Compare and check these features:

QUIET OPERATION — The sound level of SORGEL dry-type transformers is well below the established standards. Therefore they are adaptable for any indoor installations, including those structures where sound levels are an important factor.

HIGH EFFICIENCY — SORGEL dry-type transformers are designed to carry the full rated load at high efficiency.

SAFE TEMPERATURE — SORGEL dry-type transformers have a safe operating temperature.

EASY INSTALLATION — Wall brackets or floor mounting bases are an integral part of SORGEL dry-type transformers. All are equipped with solderless terminal lugs. Terminal board for the larger ratings.

UNDERWRITERS' APPROVED in all the ratings covered by the Re-examination Service, both single phase and 3-phase. They also meet or exceed the requirements of ASA, AIEE, and NEMA standards.

LONG LIFE — Thermo-vacuum impregnated windings brazed to solderless terminals assure years of trouble-free service.

Available in all standard and intermediate ratings and voltages — ¼ to 3000 Kva up to 15000 volts.

SUBSTATIONS—SORGEL transformers, either dry-type or Askarel-cooled, are incorporated in substations, complete with primary or secondary switchgear. They are procurable with any make of switchgear, and from any substation manufacturer.

SORGEL TRANSFORMERS

SORGEL ELECTRIC CO. 835 WEST NATIONAL AVE., MILWAUKEE 4, WIS.

Sales Engineers in Principal Cities

capacitors. If one says that there is plenty of space in the vault and that no charge for such space is assignable to the capacitors, he is in fact merely saying that the vault of his design is larger than it need have been, thereby acknowledging the fact that he misspent the company's funds in the first place. Thus, you can justify the contention that vault space is not chargeable to capacitors installations only by admitting a previous blunder in the design of your vaults.

As to the transformer, you are pretty well forced to accept one of the standard designs as far as dimensions go, and if you care to provide space for capacitors, engineering honesty demands that you add the incremental cost of vault space to the cost of your capacitor installation. Since the usual analysis of the economics of the capacitors installation barely justifies their use, a slight additional charge against them will so unbalance the scales that their use will not be economically sound.

(3) Switches. In none of the papers which have come to the author's attention has provision for switching the capacitors been made. Taking the larger transmission systems as they exist today, most of the distribution engineers have been told by the transmission and production engineers that the system is loaded with fixed or unswitchable capacitor units and, in order to keep the power factor (and voltage) down during off peak hours, only switchable capacitor units are to be installed in the future.

This means that if secondary network capacitors are installed without switches it will be necessary to add switches to some overhead or substation type capacitor units in order to reduce the effective number of them during off peak hours. Is it correct, therefore, to say that the network capacitors require no switches? By all rules of logic and sound engineering, the cost of switches for an equivalent rkva of capacitors must be provided elsewhere, and it is the author's conviction that such cost should be taken into consideration when making an analysis of the economic value of the units installed in transformer vaults. This additional cost would reflect to the disadvantage of the underground units which already have a questionable justification.

Looking at this problem from a slightly different angle, it is well established that on any particular system there will be a ratio of fixed to switched capacitors to give optimum efficacy. Whatever this ratio might be for your system, the fact remains that for every rkva of capacitors installed, switches will be required on a certain per cent of them. Hence, the more unswitchable units that are installed underground, the more switches that must be provided on overhead lines or in substations to maintain the ratio. Just why those units going underground would escape all charges for these switches is not understood by many. For each unit installed underground a portion of a switch will have to be supplied somewhere and, hence, the underground units should carry their appropriate percentage of the cost of such switches. The entire over-all system cost of all your capacitors is the item that should be considered and not the incremental cost.

As far as the generators are concerned, there might be some additional benefits to be had by putting the units underground. The main objection, however, is that the fixed overhead line type units are well justified and sorely needed on the overhead system where they usually pay for themselves by reduction in losses alone. In addition, they lower the voltage drop between the first and last customers and reduce the required size of the substation transformer serving the area. Thus, it appears certain that the overhead line type capacitors are here to stay; that they more than pay for themselves; and that they are a practical necessity on low power factor overhead circuits.

To say that you can remove one of them and replace it with an underground unit is to say that they were never needed in the first place. The underground units do not in any sense do the job of the overhead line units and the general practice of charging only incremental cost to the underground unit is in the author's opinion a colossal error. Almost never is an underground network fed by an overhead circuit supplying distribution transformers, so that the installation of a capacitor unit in the underground network contributes nothing to the improvement of voltage and power factor conditions on the overhead system.

The net result of this philosophy is that you can put capacitors on your networks if you want to, but you are obliged to base your economics on the actual—not incremental—cost of the network units.

(4) Voltage correction. From the standpoint of generation, transmission and subtransmission it matters little where the capacitors are installed and these elements of the system are the ones to be benefited most. Thus a $6.00 overhead unit will produce all of the good that can be derived from a $25 or $30 network unit. Of course, right away comes the cry that network capacitors are needed not only to increase the network transformer capacity but also to give good voltage in emergencies when one network feeder is out of service.

Adequate voltage at the customer is certainly one of our responsibilities. Usually, a low voltage condition on the fringe of the system during an outage of one feeder can be satisfactorily corrected by the addition of capacitors in the vault nearest the customers affected. This is not only good practice, but an essential one. Note, however, that the capacitors are there principally to correct voltage and not just to save money. There can be no great criticism of this general practice, but it does not create the need for capacitors on any great number of the transformers.

(5) Variation in value of capacitor with time. On a transformer supplying a fixed load the installation of capacitors on the low side can well be justified if the installed cost is less than that of additional transformer capacity. The saving can be calculated and will be realized throughout the life of the installation. On a growing network system a different set of circumstances confronts you.

Suppose, for the sake of argument, that you justify the cost of installing capacitors on a network because of the extra transformer capacity made available. You probably make your analysis by comparing the total cost of the capacitors against the cost of additional transformer capacity. In a few years, load growth comes into play and you find it necessary to install another transformer nearby which results in a decrease of load on the transformer equipped with the capacitors. Then, for several years, the capacitors are actually of no value to you and you could

(Continued on page 54)

Service entrance characteristics determine metering methods

Inside view of type STS-3 transocket showing current transformers, primary bus bars, and secondary wiring installed before device is issued for installation.

Increased demands on service entrance equipment have resulted in the need for higher capacity meter equipment. New devices described here show that manufacturers are aware of this need.

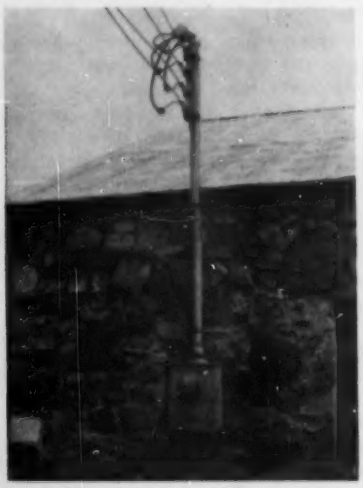
By Robert M. Ballard, Division Meter Superintendent, Georgia Power Co., Rome, Ga.

◆ GROWING PAINS is one malady about which no business should complain. Growth is a very good indication that there is life and a future. Growth demands that certain adjustments be made. In making these adjustments one should exercise care to assure that the greatest extension of benefits is derived.

With the rapidly increasing use of electricity has come an advance in metering methods. Increased demands on service entrance equipment have of necessity resulted in the need for higher capacity metering equipment. Today's metering equipment must not only be adequate for today's load, it must also be expandable to meet the ever growing demands of the future.

Continuity of service, which all electric utilities take pride in maintaining, is assured to a larger degree if the capacity of the metering equipment is at least equal to the capacity of the service entrance conductors. Often when enough thought is not given to the selection and installation of metering equipment it incurs unnecessary expense and inconvenience in the future. To assure the proper application of metering equipment it is important that close cooperation be maintained among the architect, contractor, and utility.

Front view of type STS-3 transocket with lower section of cover removed to show test block and secondary wiring installed before device is issued for installation.



Type STS-3 transocket installation showing the facility with which it is adaptable to the service entrance conduit and service mast.

Type STS-3 transocket installation showing neat appearance and accessibility for inspecting, testing, and reading meter.

It is not purposed to discuss in this article those metering installations that require the use of potential transformers. Installations requiring the use of potential transformers represent a relatively small percentage of our total meter installations, but each is usually well planned and designed to meet conditions that are peculiar to the particular installation.

High capacity devices

The manufacturers of metering devices have been aware of the growing need for high capacity metering equipment. Meter sockets are now obtainable not only in the 100 ampere capacity but also in ratings of 150 ampere, 175 ampere, and 200 ampere. The transocket, which is a package unit device with current transformers and meter socket, extends this category to 400 ampere capacity.

The advent of the window-type 600-volt current transformer has been a great aid in simplifying the facility with which metering equipment may be applied to the higher capacity installations. Through the use of this transformer many more installations are now economically metered outdoors than would have been possible before its development.

The service mast has also proved satisfactory in economically providing proper clearances of service drops to low-roofed buildings. In many instances we find it very satisfactory to run the service mast directly to the meter socket.

Outdoor polyphase meter installation showing dual purpose service mast-service entrance conduit.

Single-meter and double-meter single-phase meter sockets with 2-inch hubs are used extensively in this area for this type of installation.

In order that service entrances may be accurately, adequately, and economically metered, we observe the following general practices in the applications of our metering equipment on services of 120 volts and 240 volts.

Application practice

For single service entrance conduit or cable, single-phase: wire size, #8 to #12, 100-ampere standard socket; wire size #1 to #2/0, 150-ampere medium duty socket; wire size #3/0, 200-ampere heavy duty socket; above wire size

Single-phase service showing adaptability of dual purpose service mast to meter device with 2-inch hub.

#3/0, transocket or current transformers on bracket, and cabinet with transformer rated meter socket and test block.

For single service entrance conduit or cable, three-phase: wire size #8 to #2/0, 150-ampere medium duty socket; wire size above #2/0, transocket, or current transformers on bracket and cabinet with transformer-rated meter socket and test block.

Multiple service entrance conduits or cables are generally metered outdoors by use of bracket mounted window-type current transformers and a cabinet with transformer-rated meter socket and test block.

Multiple polyphase outdoor meter installation showing dual purpose service mast adapted to heavy duty meter device which also supplies service to medium duty meter device.

Outdoor meter locations are preferred; however, indoor installations are approved under certain conditions.

The type of meter device is determined by service entrance wire size and number of service entrance conduits or cables.

Some installations require a meter housing cabinet in which case we use an A-base transformer-rated meter and a standard outdoor meter box which houses meter and test block.

The more costly type of installations (those requiring the use of current transformers) are only used where load conditions are such that the extended-range 50-ampere single-phase meter is not adequate to carry the load. Many relatively large installations may be economically and adequately metered by using the heavy duty (200 amp) metering device and a self-contained single-phase meter on service entrances of #3/0 wire size or on polyphase through #2/0 size.

Use of transocket

Current transformers are used on all installations having service entrance conductors larger than stated above. The use of the transocket device on every installation where it is adaptable saves considerable time of the meter department because of its not requiring the meterman's presence when installation is made

and when meter is set and service established. In such cases the installation inspection, which is made by a qualified meterman within 30 days of the meter set date, assures the accuracy of the meter installation for billing purposes.

At present we purchase the transocket cabinet less current transformers and test block. We then install the current transformers, test block, and secondary wiring before the cabinet is issued for installation.

The transocket has proved itself to be a manhour saver in the many installations where it has been used. Field inspection of all connections may readily be made by a meterman without the aid of a lineman as the cabinet is mounted at a height (four to six feet) that makes it conveniently accessible for tests and inspections.

Economy and efficiency of operations are effected by the proper balance between the meter devices stocked for standard installations and those that are approved for use but available only on special order. Available from our company's stores department are sockets with standard hub sizes as follows: single-phase—1", 1¼", 1½", and 2"; three-phase—1½". Sockets are stocked with interchangeable hubs to accommodate varying sizes of service entrance conduits. Hubs of other sizes are available upon special order from the company's Division Meter Department.

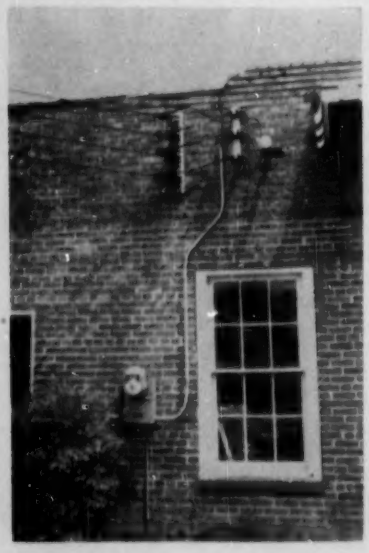
Showing CT's mounted on wall bracket and adapted to multiple service entrance conduits.

Showing two-inch service mast adapted to single phase socket with 2-inch hub.

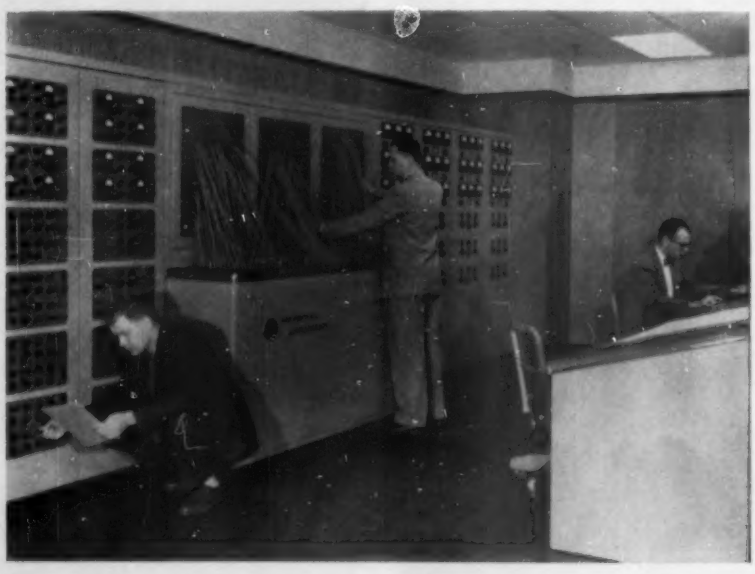
Determining capacity

In determining the meter capacity requirements of an installation it has been found that obtaining connected load data is not a reliable means on which to base the capacity of the metering equip-

(Continued on page 54)



Showing CT's mounted on wall bracket and adapted to old service entrance to replace indoor metering equipment to allow plant expansion at original metering point.

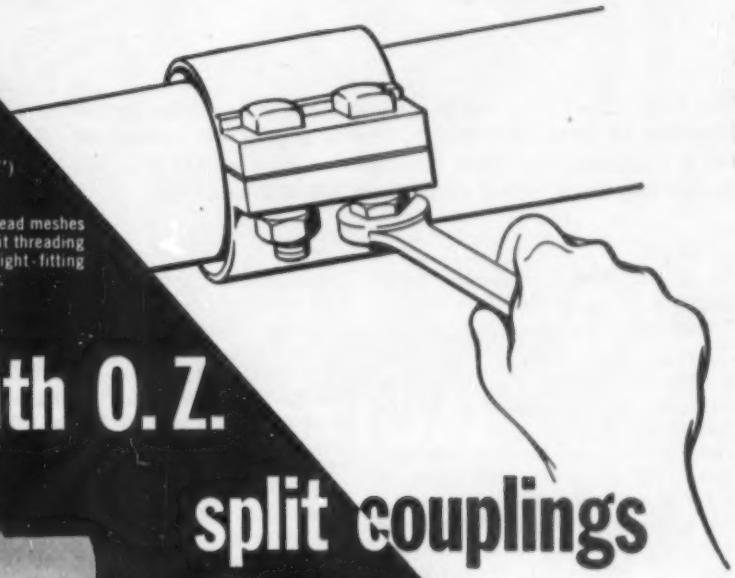


NEW NETWORK ANALYZER AVAILABLE—This network analyzer installation is now available to public utility companies and others for use in making power system studies. Fast operation, accuracy and minimized advance preparation recommend this unit for completing complex problem solutions in short time. The unit is located in downtown Philadelphia and is operated by I-T-E Circuit Breaker Co.

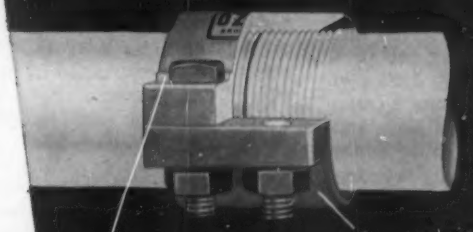
*"TOUGH" conduit coupling jobs

(Type "SP")

Interior thread meshes with conduit threading for rigid, tight-fitting connection.



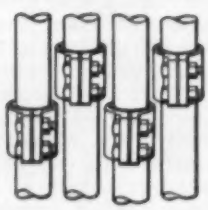
are easy with O. Z. split couplings



Bolt heads are held in place by shoulder on coupling, eliminating need for second tool.

One piece malleable iron construction facilitates handling during installation.

To install, simply slip over one conduit end, butt ends of both conduits, slide fitting back into position and tighten nuts.



* **"Tough"** – (Where ordinary couplings can't be installed). Are clearances close – near floor, wall, ceiling or other obstructions? Can conduits be turned due to bends? Is space or accessibility a factor? Just install an O. Z. Type "SP" Split Coupling.

Butt the conduit ends within the O. Z. Split Coupling – tighten two nuts with an ordinary open-end wrench and presto . . . you have a permanent, close-fitting, rigid connection.

Drastically reduced installation costs, plus initial savings of as much as 50% in larger sizes, over similar competitive fittings, are just two of the many reasons why you should specify O. Z. Split Couplings for your difficult conduit coupling jobs.

Call your local O. Z. distributor . . . he is ready to make immediate delivery from stock on sizes from ½" to 5".

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CAST IRON BOXES
CABLE TERMINATORS
POWER CONNECTORS
SOLDERLESS CONNECTORS
GROUNDING DEVICES
CONDUIT FITTINGS

Relaying a modern power system

The tremendous increase in system loads is requiring extensive modification of relaying schemes. This is a progress report on relaying for a company operating transmission lines at 132 and 330 kv, with generating units rated as high as 220,000 kva.

By E. W. Woody, System Relay Engineer, Appalachian Electric Power Co., Roanoke, Va.

◆ THE SYSTEM RELAY protection of the Appalachian Electric Power Company has in the past ten years undergone considerable change. The installation of several generating plants (400,000 kva to 600,000 kva capacity each) with units rated up to 220,000 kva, construction of additional transmission lines, and addition of large blocks of load, which require an uninterruptible source of power, has made necessary for the modification of our relay schemes. It is essential that relay protection for the 330 kv and 132 kv systems be highly sensitive, operate in 1 to 2 cycles and yet not operate incorrectly for faults outside of their protective zones. High speed relay protection has been in service for the last ten years or longer on all 132 kv circuits. However, as the system has enlarged, many of these relays have become obsolete and are now being replaced by the most modern equipment available.

330 kv line relaying

Recently two 330 kv stations were cut in service on the Appalachian Electric Power Company system. As these stations are important links in the American Gas and Electric Corporation system which provides power for the Atomic Energy Commission at Portsmouth, Ohio, every effort was made to provide a highly reliable relay system.

Line phase relay protection consists of carrier controlled mho type relays which permit ultra high speed reclosing (27 cycles) of the oil circuit breaker. These relays are not the conventional three step zone relays, but are single mho units which have the advantage of being separate from the back-up relays. If the phase carrier relays have to be removed from service or fail to operate, a dual zone reactance relay has been provided for back-up protection. Zone 1 is set to cover 90% of the protected line section, has no time delay and permits ultra high speed reclosing of the oil circuit breaker, zone 2 (mho unit) trips with time delay and does not permit ultra high speed reclosing. Faults which are not cleared by the carrier and back-up relays due to failure of the oil circuit breaker to interrupt, or for some other reason, are cleared by the oil circuit breaker failure relays. These are dual zone reactance relays identical to the back-up relays. Both zones are provided with time delay and operate the 330 kv bus differential relays which in turn trip all oil circuit breakers that are connected to the same bus as the oil circuit which has failed to clear. Simple plunger type instantaneous relays are used in coordination with the failure relays to prevent misoperation.

The ground carrier relay is a three element directional tripping and carrier starting relay. This relay operates through the same carrier control equipment as the phase carrier relays and permits ultra high speed reclosing of the oil circuit breaker.

There are two ground back-up relays, one is a high speed directional relay which is set to cover approximately 90 per cent of the protected line section, has no intentional time delay and permits ultra high speed reclosing of the oil circuit breaker. The other relay, a directional control overcurrent relay, has time delay and does not permit the oil circuit breaker to reclose ultra high speed. The oil circuit breaker failure ground relays are identical to the back-up ground relays except they are set with time delay to permit co-ordination with the back-up relay. A 15 cycle time delay for phase and ground Zone 1 oil circuit breaker failure relays has proved satisfactory.

In order to insure still more reliable relay operation, two separate sets of bushing current transformers are installed in each oil circuit breaker on the bus side. The carrier and oil circuit breaker failure relays have current coils in one set of these transformers, whereas the back-up relays have current coils connected in the other set of transformers. Potential for polarizing phase and ground relays is taken from potential devices which are installed on the bus side of each oil circuit breaker. Therefore, each oil circuit breaker is supplied from a separate potential source. All directional ground relays are dual-polarized with current polarizing obtained from the 13.2 kv tertiary winding of the 330/132 kv transformers.

330 kv bus protection

The Appalachian Electric Power Company for many years has installed bus differential relaying on all high voltage busses (132 kv down to 22 kv). Before the relaying for the 330 kv system was planned it was considered justifiable to provide complete bus differential protection at all 132 kv stations. That is, protection at all times regardless of switching setup. This same scheme of protection is installed at the 330 kv stations. Protection is provided at all times, except very short intervals in which to transfer current and control circuits, under oil circuit breaker by-pass condition and single bus operation. By keeping the bus differential relays in at all times, bus short circuits can be cleared in a maximum of 4 cycle relay time plus oil circuit breaker clearing time. This limits damage at the station involved and

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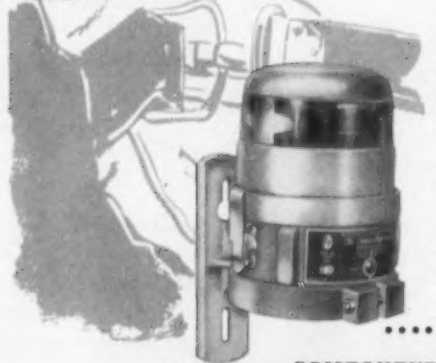
This article is adapted from an address made before a recent meeting of the Engineering and Operation Section of the Southeastern Electric Exchange.

ASK YOUR MAN IN THE FIELD ABOUT THE

PROTECTION

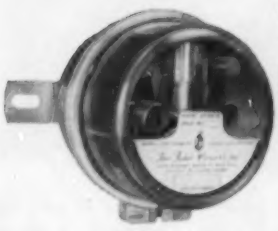
IN FISHER-PIERCE PHOTOELECTRIC LIGHTING CONTROLS

Lighting engineers who have specified F-P controls for installations know that a basic reason for the highly dependable operation of these controls is their carefully engineered *protection* against surge voltages, transients and lightning. Here are specific examples: components are spaced to withstand a *minimum* of 3000 volts RMS between any circuit point and grounded case, without breakdown; F-P tests to *5000* volts; basic insulation level as high as 7500 volts without arrestor . . . control circuit and load can both be fused against transients and surges . . . design provides fail-safe operation, so that controlled load remains on or becomes energized in the event of any functional failure . . . transformer is the type which isolates the supply voltage from the control circuit . . . components are all operated well below maximum ratings . . . the load relays used in F-P controls will handle an inrush current ten times the steady state current . . . larger controls can be equipped with accessory lightning arrestors. Protective design features like these pay off in lower installation *and* operating costs. And *only* F-P controls combine such protection with these four other important features:



64400

COMPONENT QUALITY . . . Pre-aged, long life tubes. Wire wound potentiometer. Metal encased and ceramic capacitors. Non-hygroscopic 1P39 phototube. Balanced armature Sigma sensitive relay.



63300C

DESIGN ADVANTAGES . . . Can be installed, serviced or removed safely and easily. Wide mounting versatility and orientation *after* bracket installation.

ADAPTABILITY . . . Three basic series and numerous models for all mounting requirements, operating voltages, load capacities and desired contact arrangements.

DEPENDABILITY . . . Proven by the thousands of F-P controls used by hundreds of utilities, over the past ten years.

Fisher-Pierce Bulletins, available upon request, give complete specifications and operating data.

THE FISHER-PIERCE CO., INC.

59 Pearl Street, So. Braintree, Boston 85, Mass.

prevents serious interruptions throughout the remainder of the system.

An arrangement of auxiliary switches on the oil circuit breaker selector and by-pass disconnects transfers the bus differential control and current circuits from the normal two bus protection scheme to a single overall bus differential. A high speed motor operated switch transfers bushing current transformers from one circuit to another.

The fault detector relays are of the voltage differential type which insures freedom from false tripping due to bushing current transformer saturation.

As the oil circuit breakers are equipped for automatic reclosing in addition to ultra high speed reclosing, provision is made to test the bus one time before tripping a lock-out relay. The lock-out relay must be hand reset before any further reclosures can take place. Ultra high speed reclosing of any oil circuit breaker on bus faults is prevented by the control scheme.

Lower voltage relaying

The primary relay protection for all 132 kv and 88 kv circuits, except for a few circuits, is provided by directional comparison carrier current relays of the mho and reactance types, or older style impedance relays. Phase back-up relays are either mho type or reactance zone relays and are in the same cases as the carrier relays. The ground back-up relays are plunger type instantaneous relays and induction overcurrent relays. Consideration is being given to the possibility of installing oil circuit breaker failure relays at the more important 132 kv stations. This will be similar, but not as extensive as the 330 kv failure scheme.

All 132 kv and 88 kv circuits which are equipped with carrier current relaying have oil circuit breakers which reclose ultra high speed (15 cycles - 20 cycles) when tripped by the carrier relays. In addition to ultra high speed reclosing, other automatic reclosing equipment provides up to three reclosures within 1½ to 3 minutes before lock-out.

Most circuits below 88 kv are protected by instantaneous and induction overcurrent relays; however, on circuits which supply large industrial areas carrier current relays or pilot wire relays are being used. Also on short city feeders of 44 kv, 33 kv and 22 kv

(Continued on page 52)

Mississippi utility cuts costs with jib crane installation

◆ Mississippi Power & Light Co., like other power utilities across the nation, was faced with the problem of keeping rates down as expenses skyrocketed.

President Baxter Wilson, under whose leadership the company has become recognized as among the most progressive in the South, attacked the problem from several directions—one of the most effective of which was in the field of materials handling.

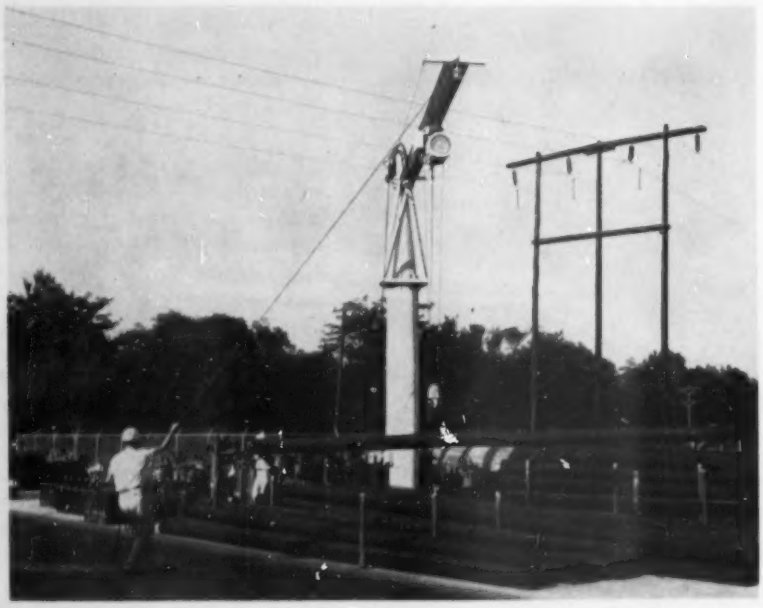
An example of how this phase of the program paid dividends was disclosed in an interview with President Wilson, at the company's home office in Jackson, Miss.

He discussed the new installation of a four-ton "inching control" hoist and jib crane which his company installed at its new Service Center at Vicksburg, Miss.

From a directly financial standpoint, Mr. Wilson reported: "The crane, plus hoist, concrete slab and mountings, represents an investment of approximately $5,500. Judging from the period it has been tested by us, however, we are confident it will pay for itself in less than two years."

According to Mr. Wilson's account, the new jib crane permits the handling of transformers, poles, and reels of conductor "in a matter of minutes." At the same time, he said, it eliminates the need for a large stockpile at the Vicksburg operation.

The old method of handling materials required poles to be at ground level, he explained. The line truck, with trailer attached, was spotted at the end of the poles. The winch line was passed over a sheave and headache bar, over the trailer to the pole. The pole then was pulled up and over the trailer

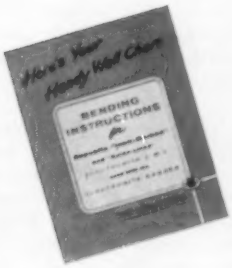


Reducing pole-loading time from 15 minutes to two minutes is one of several benefits achieved by Mississippi Power & Light Company through use of a jib crane with "inching control" hoist, both manufactured by R. G. LeTourneau, Inc., of Longview, Tex. Large transformers and reels of conductor in background are also handled by jib crane.

YOU'LL STAY 'WAY AHEAD OF THE CONCRETE BOYS...when you're installing

SMOOTH BENDING AND EASY MEASURING are two reasons Republic ELECTRUNITE E.M.T. is so popular. The Guide Line, when properly used, eliminates costly "wows". Bends can be pre-planned, made accurately right on the job. Simply align the Guide Line with correct calibrations on the Republic Bender and you can't miss. "Inch-Marks" help you avoid clumsy problem of a flat rule on a round tube. Each inch and foot of tubing is clearly marked to permit easy measurement of exact length. On all popular sizes.

REPUBLIC "Inch-Marked" E.M.T.



IT'S "INCH-MARKED"
for easy measuring.

IT'S "GUIDE-LINED"
for accurate bending.

You don't have to worry about a pocket full of wet concrete when you work with Republic ELECTRUNITE® E.M.T. It goes in so smoothly you can't help staying ahead of schedule.

The reason: Republic E.M.T.'s *exclusive* features that simplify the job from planning to wire pulling.

Measuring distance is easier because the entire length of tubing is marked in inches and feet. Bends are easier to make accurately—and without costly "wows"—due to the handy, longitudinal Guide Line. Wire pulling is almost effortless because of the knurled "ball-bearing" inside surface of the tubing —another Republic exclusive.

Republic ELECTRUNITE E.M.T. makes it easier to meet schedules for any type of construction. For concrete-slab construction it's 100% approved by the National Electrical Code.

Keep the concrete boys off your back, and at the same time reduce costs by installing Republic E.M.T. Just ask your electrical distributor for the E.M.T. that's "Inch-Marked"® and "Guide-Lined." Check box in coupon to get free wall chart (left) that includes tips on using the Republic Calibrated Bender.

REPUBLIC STEEL

World's Widest Range of Standard Steels and Steel Products

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Please send me more information on:
☐ ELECTRUNITE "Inch-Marked" E.M.T.
☐ Bending Instructions (Handy Wall Chart)

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

into balance position. Also an A-frame had to be set up to load any quantities of pole.

"This method required 15 minutes per pole by several members of the nine-man crew who stood by until the equipment was mounted," Mr. Wilson said. "The new operation takes only approximately two minutes per pole."

Other advantages

"Another big advantage to the company is that two people can load heavy equipment which is to be taken to an emergency operation. Also we have found that the crane eliminates certain safety hazards and 'idle dollars' invested in large stockpiles. For instance, the sorting of poles according to size makes it unnecessary to buy carloads of poles in different sizes. And, of course, the space factor is quite important in many instances.

Mr. Wilson gave credit for the idea of purchasing the crane to Joe Box, who at the time was division engineer at Vicksburg and who since has been elevated to assistant manager of the Central Division. Mr. Box had observed the crane in operation, then drafted the layout as to how Mississippi Power & Light Company could adapt it to its own operations. The plan, as drawn up by Mr. Box, was approved by President Wilson and Ray Braswell, vice-president in charge of operations.

Jib cranes and hoists of the type Mississippi Power & Light has installed are manufactured in capacities from two to 15 tons.

Appalachian microwave system meets communication demand

◆ APPALACHIAN Electric Power Company will soon be using an eight-station microwave system to connect its main offices in Roanoke, Va., and Charleston, W. Va. Receipt of the contract to supply this equipment was recently announced by Leonard G. Walker, marketing manager of the microwave and industrial products section of Motorola's Communications and Electronics Division.

The proposed microwave system is one of the first steps in a five-year program planned by the utility company to meet the demand for economical, dependable communication. The new system which spans 145 miles of mountainous country is designed to provide ten channels of communication for both voice and teletype. One of the channels will be used to connect the PBX systems at the two main offices. As the communications grow, the system can be expanded to twenty-four full voice channels.

Although this is the first use of microwave for Appalachian Electric Power Co., its parent company, American Gas and Electric Service Corp., has had a microwave system in operation since 1954. In extensive tests conducted on this system, the microwave was found to provide 99.98 per cent dependability.

The Appalachian microwave system will span some of the most rugged terrain in that part of the country. Most of the installations will be made on mountain tops or ridges. Repeaters will be installed at Coal Fork, Lick Knob, Flat Top, Butt Mountain and Poor Mountain.

System relaying

(Continued from page 50)

pilot wire relays using telephone company facilities are used.

132 kv bus protection

Busses at all stations of 132 kv to 22 kv, except for a few where there are only one or two oil circuit breakers, are protected by some form of bus differential relaying. 132 kv busses at major generating plants are protected by the same scheme as used on the 330 kv system. At 132 kv stations which have by-passing facilities, and where it is required to remove the normal bus differential protection while switching, the overall and by-pass differential scheme is used. This scheme is similar to the 330 kv scheme but is not quite so elaborate. It, however, provides as complete protection as the 330 kv differential set-up.

The fault detector relays at important generating stations are of the voltage differential type. All other installations use the short time overcurrent relay. The control circuits permit automatic reclosing to test the bus after the fault detectors have operated, followed by lock-out if the reclosure is unsuccessful.

Maximum relay times on faults are in the order of 4 cycles.

Transformer protection

All transformers which have been installed on the 330 kv system are equipped with harmonic restraint transformer differential relays. Two separate sets of relays are used. One set protects from the 330 kv bushings to the 132 kv bushings of the transformer, whereas the other set covers the zone from the 330 kv oil circuit breaker to the low voltage oil circuit breaker, thereby overlapping the other set.

Transformers which have been installed on the 132 kv system for the past two years and transformers connected directly to 132 kv busses without oil circuit breakers are equipped with harmonic restraint relays. All other transformers down to 7500 kva are equipped with percentage differential relays.

Transformers, 7500 kva or larger, which are tapped from lines, have single phase ground switches operated from transformer differential relays. This insures operation of the oil circuit breakers at the remote terminals for transformer trouble. A motor operated air break switch on the transformer operates to isolate the transformer before automatic reclosing takes place.

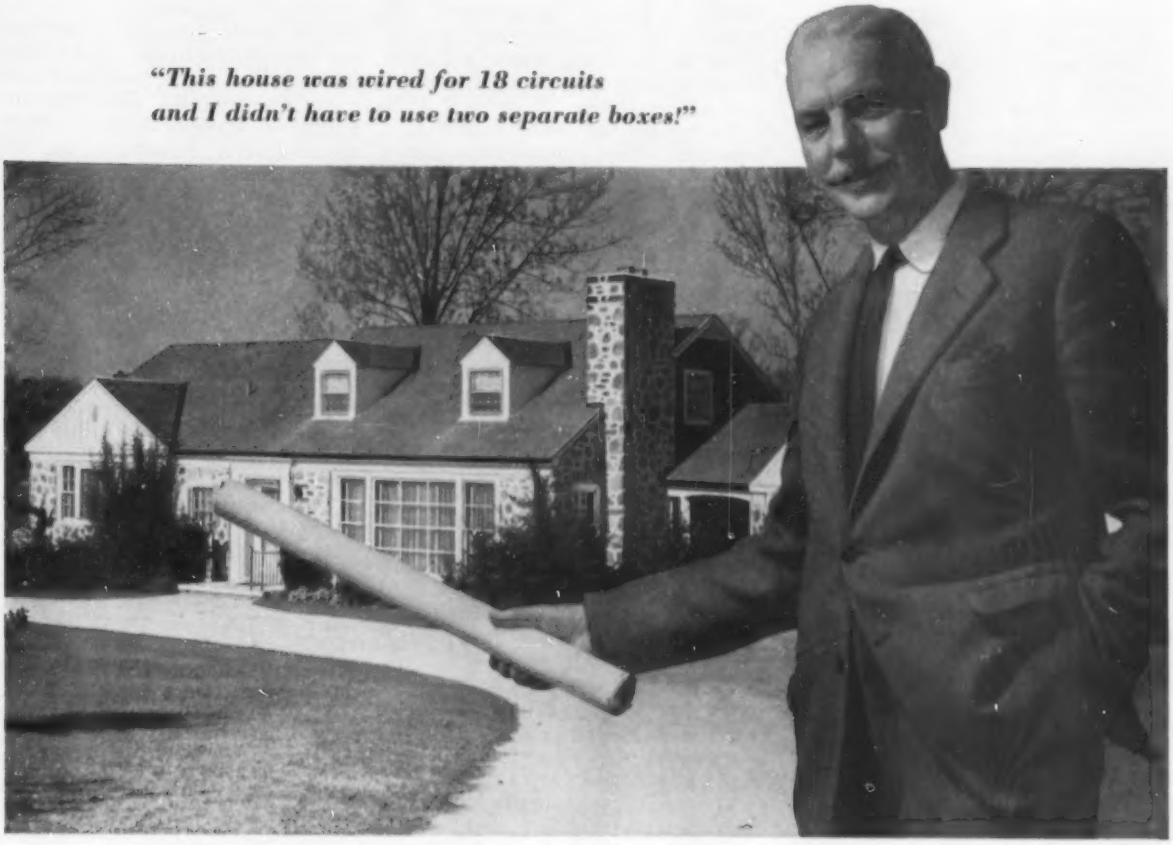
Generator protection

Generators which feed to the 330 or 132 kv directly through transformers are protected as follows:

(1) Overall unit differential extending from high voltage oil circuit breaker to generator neutral leads. Where start-up transformer is connected to generator leads, the low voltage side of it is included in the differential. Harmonic restraint transformer differential relays are used.

(2) Separate transformer differential protection using harmonic restraint relays to protect from

"This house was wired for 18 circuits and I didn't have to use two separate boxes!"



New G-E load centers handle up to 18 circuits in a "single package" installation

Each of General Electric's three new "package" load centers provide for 100 ampere, 3 wire service. You can use as many as 18 branch circuits, including five or more 240 volt two pole circuits. No separate disconnect is needed; the complete service entrance system is neatly and rapidly installed in just one box!*

Time saving features include: (1) Snap-in interiors—no screws to fuss with, plenty of working room. (2) Automatic two-way alignment of breakers and cover. (3) Straight-in wiring—no looping necessary, grips like a bear trap. (4) Silver plated copper for current-carrying parts—assures cool, long lasting performance. UL listed. See your nearest G-E Distributor, or write to General Electric Company, Circuit Protective Devices Department, 41 Woodford Avenue, Plainville, Conn.

**In areas where local electrical code permits*

Three new G-E "package" load centers. Twenty-circuit unit, TRX2010S, has 5 double-pole, 8 single-pole circuits. Twelve-circuit load center, TRM1210S, has 100-amp main breaker wired in. Sixteen-circuit split bus unit, TRPX1610, has 3 double-pole, 8 single-pole circuits. All three permit wide variety of 120 and 240-volt combinations.

Progress Is Our Most Important Product

GENERAL ELECTRIC

high side oil circuit breaker to generator terminals.

(3) Generator protected by variable slope differential relays which cover generator terminals and generator neutral leads.

(4) Generator is grounded through a distribution transformer with resistance in secondary. Time delay voltage relay connected across secondary of the distribution transformer.

Conclusions

The changes to our relay system have been made to obtain faster relay times for line, bus and transformer faults, to provide complete protection on equipment at all times and to set up a system with a high degree of reliability. Several instances have already shown the value of the overall bus differential and the breaker failure schemes. One, a 132 kv bus fault at a major generating plant while on single bus operation, was cleared fast enough to limit damage to one switch insulator and slight burns on the oil circuit breaker leads. There was a very slight disturbance on the system as a whole which otherwise could have been a complete collapse of the system if we had depended upon relays at the remote terminals to clear the fault.

Metering methods

(Continued from page 46)

ment. Our experience has indicated that the capacity of the meter installation should be at least equal to the capacity of the service entrance conductors.

Connected loads are of a variable nature and in past years have shown a marked tendency to increase to the full capacity of the service entrance equipment. It is therefore good business to see that the metering equipment capacity matches the service entrance capacity when the initial meter installation is made.

With the present rapidly expanding use of electric service it should be quite a comfort to electric utility men to know that the metering equipment on their lines offer no bottlenecks to the free flow of electric energy to their customers who are more and more living better electrically.

In order to keep pace with changing conditions brought about by load growth and new developments, metering methods must not become fixed. Metering methods should frequently be reviewed to determine whether or not beneficial use is being made of the latest approved metering devices that are available.

As conditions warrant and as new improved equipment becomes available, metering methods should be promptly adjusted to make the best of such equipment. With proper planning and due consideration given to metering methods, the increasing loads of the future should not present any serious problems to the utility with a progressive meter department.

UG capacitors

(Continued from page 43)

well do without them. You cannot remove them because of the cost involved and so they hang on your economic neck like the dead albatross.

The capacitors were installed, and your analysis presumed that they would, each year, have a value equal to that which you calculated several years ago, yet today they serve no useful purpose, but you are saddled with the annual carrying charges.

The main point to be derived from this is that we should be careful not to confuse our thinking and spend our stockholders' money for an item whose value will swing through the cycle of a questionable value at best down to absolutely zero at intervals of several years.

The manufacturers of these capacitors do not sell them to you at a figure based on the incremental cost of building them. We will go broke selling power on an incremental cost basis, and we are taking a step in that direction when we allocate incremental cost to any portion of our construction. If you have room for free riders today it is only because somebody "goofed" in yesterday's design and built something too big. That, too, is a step on the road to bankruptcy, but like the weather—"one swallow does not make a Spring"—so one false step will not bankrupt us, but for every strike-out we engineers make, somebody else in our organization has got to knock a home run to redeem us. It behooves us to so design our system that "free loaders" cannot point an accusing finger at us and demand an extravagance today for our omissions of yesterday.

(6) Control of loading on transformer. Another point which is seldom considered but is of considerable importance is the problem of securing the extra capacity theoretically available in a transformer. The mere fact that you have increased the allowable kw output of a network transformer by installing capacitors on the secondary terminals is not necessarily proof that you can actually obtain such an increase in practice. Essentially, all of the transformers are in parallel and load division will follow the old familiar Kirchoff's Law. Thus, the distribution of load between the transformers may not follow your wishes, nor will it always be influenced to the limit of your hopes by making it possible for one transformer to take more load than another.

The solution to complicated a-c network problems can best be made by use of an a-c calculating board, and in no event are we justified in installing capacitors until a board study shows that the laws of electrical circuits will result in a transformer loading up to its theoretical value. In olden days many transmission lines were built in high voltage networks without adequate study and proved disappointing because the voltage and phase angles were such that expected power flows did not occur.

Basic consideration

The hard boiled conclusion to be drawn from the foregoing is that you cannot afford the capacitors at any price unless you first make certain that use can be made of the theoretical increased transformer capacity. There are probably many locations where capacitors have been installed for the purpose of increasing the power output of a transformer, but where actually the increase is never obtained because of electricity's bullheaded determination to flow according to mathematical laws rather than according to our wanting it to flow a certain way.

In one analysis which came to the writer's attention, the entire cost of the underground system was used to determine the average cost per kw of capacity and this figure used to compare the cost of increasing the kw rating of the transformers by capacitors. Naturally many capacitors could be justified in such an analysis and much money was actually spent for them. Aside from the question-

(Continued on page 86)

Your Work Can Wait!

"Keep an eye on young Bailey there - I think he's got what it takes"

"Also, this one has a very unique expansion attic"

"She finds me papers in five seconds flat- that's all I care about!"

"Compliments of the management, gentlemen"

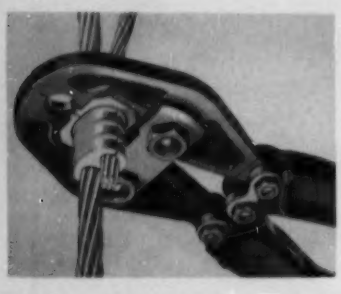
"What else did you get for Christmas besides the new rug?"

Notes on new utility equipment

Compression fitting tools feature "snap in-out" dies

A NEW LINE of tools for compression fittings features interchangeable insert dies that snap in and out with two-finger ease. The lever-action tools, manufactured by James R. Kearney Corp., 4224 Clayton Ave., St. Louis 10, Mo., are said to install the widest range of compression sleeves and fittings, with greatly increased operating efficiency.

Each self-aligning die half locks into its rectangular seat by a shoulder



and a groove, and is held in place by spring-locking pins. This prevents any possibility of the dies "rocking" or "canting," and gives utmost rigidity for operation of the tools. Dies are available from the manufacturer to install compression fittings for most wire sizes used on distribution systems.

The manufacturer states these new tools are lightweight, rugged, economical in cost, and safe for use on energized circuits at distribution voltages.

For additional data, ask for item U-1230, using the coupon on page 61.

Belleville spring washer featured in new clamps

DOSSERT Manufacturing Corp., 249 Huron St., Brooklyn 22, N. Y. has introduced a new line of low cost aluminum Universal clamps. A primary feature of these connectors is the use of a stainless steel Belleville spring washer used in preference to a lock washer. This has the ability to counteract cold flow of soft aluminum conductors and maintain uniform clamping force during heat cycling.

Again proving its superiority in design, this advanced clamp utilizes a square head bolt which permits tightening with either one or two wrenches — with the unique option of using only one wrench since the bolt head is captive. With this feature, more than twice the clamping pressure can be applied, resulting in a better and more permanent connection.

For additional data, ask for item U-1231, using the coupon on page 61.

New instrument transformer completes butyl-molded line

GENERAL ELECTRIC, Schenectady 5, N. Y., has announced a new 8700-volt instrument transformer that completes the company's butyl-molded CT family, ranging from a 600-volt miniature to a 15,000-volt outdoor model.

The JKW-4 current transformer is designed for outdoor services and is suitable for operating meters, relays and control devices. It replaces both the JKB-4 and the JK-10 and is approximately half the size and weight of its predecessors.

Available in all standard single-primary current ratings 10 to 800 amperes inclusive, the JKW-4 has a single 5-ampere secondary for all ratings. Frequency rating is for 25 to 60 cycles.

Molded of Hy-Bute/60 insulation—General Electric's newly-developed non-tracking butyl compound—the JKW-4 current transformer meets the test requirements of the 8.7 kv standard insulation class. The ASA Standards specify a one-minute, 26 kv test at 60 cycles and a full-wave impulse test at 75 kv.

High accuracy is a feature of this transformer, say the Instrument Department engineers. It is suitable for accurate metering down to 5 per cent of rating and up to the continuous thermal limit. It also can operate relays up to twenty times rated current.

Type JKW-4 transformers in the primary current ratings 10 to 200 amperes will stand continuous operation at 150 per cent of rated current without exceeding the allowable 55C rise with a 30C ambient. Primary current ratings of 300 and 400 amperes will stand continuous operation at 133 per cent of rated current and 600 and 800 ampere transformers will stand 100 per cent, the engineers said.

For additional data, ask for item U-1232, using the coupon on page 61.

Laminated Formica-aluminum for control-panel fabrication

TIME AND EFFORT required for installation of additional instruments on control-panels has been greatly reduced through introduction of a new panel board material. Panellit, Inc., Skokie, Ill., designs, engineers and builds control and data handling systems for industry.

M. D. Shriver, vice-president in charge of sales, states, "This new panel surface accommodates the

overwhelming demand for easier reworking of instrumentation facilities in the field."

The new panel material is 1/16" sheet formica bonded to either side of ¼" aluminum plate. This formica-aluminum lamination is now offered in addition to painted ¼" steel plate for coordinated control panels fabricated by the Skokie manufacturer. It is available for all control room panel applications, including conventional large case, conventional large case graphic, and miniature graphic panels.

Ease of reworking this new material permits reduction of the time, effort and cost of panel revisions in the field. At the same time, the smooth, durable formica facing offers enhanced panel appearance and high resistance to scratching and denting. An additional major advantage results from a sharp reduction of panel material weight, reducing shipping and handling charges.

For additional data, ask for item U-1233, using the coupon on page 61.

Drop-forging adds strength to straight line clamps

A COMPLETE SERIES of BTC straight line clamps, drop-forged from aluminum or steel, is now being introduced by the Hi-Line Division of The Brewer-Titchener Corp., Cortland, N. Y.

The series consists of three sizes of straight line clamps, available with or without drop-forged socket adapters and developed for distribution, light transmission and sub-station use on all conductors, including copper,

NO false alarms...
NO service interruptions

with

Thermalite

Overload Indicators

THE *Thermalite* indicator does not respond to momentary abnormal conditions. It does not interrupt service to your customers at any time — in any way. The brilliant red light gives warning of overloads. It takes the following load factors into account automatically: (1) high ambient, (2) amount of overload, and (3) duration of overload.

Eliminates Expensive Surveys

Visible for hundreds of feet, the *Thermalite* indicator can be checked from a service truck. Overloaded transformers are singled out without the expense of a complete survey. Replacement or other system changes may be made at your convenience.

Greater Utilization Possible

You can stretch transformer dollars by taking advantage of the inherent overload capabilities of distribution transformers on your system. *Thermalite* indicators let you use this capability without endangering service continuity.

Low-cost *Thermalite* indicators are available on Allis-Chalmers distribution transformers 167 kva and smaller, 15 kv and below. For complete information, contact your nearby A-C district office or write Allis-Chalmers, Milwaukee 1, Wis.

Thermalite is an Allis-Chalmers trademark.

A-C ALLIS-CHALMERS

A-5244

ALLIS-CHALMERS

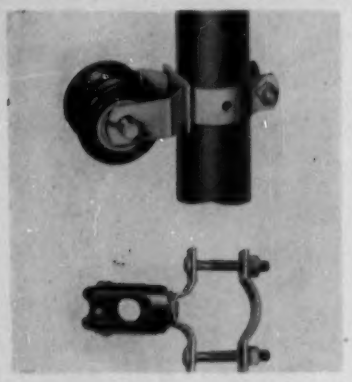
all-aluminum, 18 x 1 and other ACSR conductors. Lightweight and amply strong, the clamps are available with bore size ranges of .30" to .60", .46" to .90", and .65" to 1.25".

The corona-free beaded aluminum or steel body of the clamps possesses great strength due to drop-forging. The clamps' smooth, die-forged wave form cable seat develops adequate slip strengths. The rated ultimate strength is 15,000 lbs. for the steel clamps and 12,000 lbs. for the aluminum clamps. The loop is sufficiently large to accommodate a come-along hook or shackle. All steel parts are hot-dip galvanized for longer service.

For additional data, ask for item U-1234, using the coupon on page 61.

New service deadends for ranch type houses

TWO NEW service entrance brackets, designed for ranch type houses, are being offered by Line Material Co., 700 W. Michigan St., Milwaukee, Wis. These brackets clamp securely



to the service entrance conduit and provide a sturdy, inexpensive method for deadending service drops.

The wireholder type deadend accommodates standard service wires and can be mounted on rigid conduit of 1¼ through 2½ inches IPS. All metallic parts are galvanized steel, except a spun copper rivet fastening the insulator to its supporting strap.

The spool type deadend, consisting of a clevis and spool insulator, provides a large radius for heavy conductors. It can be mounted on 2- or 2½-inch rigid conduit. Except for a self-locking brass cotter key, all parts are galvanized steel.

For additional data, ask for item U-1235, using the coupon on page 61.

Portable phase angle meter offers direct relay check

COMPLETELY self-contained, and requiring no auxiliary equipment for its operation, the portable phase angle meter by Eastern Specialty Co., 3617 N. 8th St., Philadelphia 40, Pa., offers a direct way of checking relay and instrument connections, particularly directional over-current relays, differential relays or similar equipment. It may also be used to measure the prevailing power factor

in each phase of a polyphase watthour meter installation.

The device has a frequency of 60 cycle, with voltage ranges of 60, 120 and 240 volt. Current ranges are 1, 2.5 and 5 amperes.

For additional data, ask for item U-1236, using the coupon on page 61.

New oscillograph features direct-recording principle

A DYNAMIC recording oscillograph that produces instantly-readable records through a completely new direct-recording principle has been announced by the Heiland Division of Minneapolis - Honeywell Regulator Co., 5200 E. Evans Ave., Denver, Col.

The new oscillograph, called the Visicorder, combines the high-frequency and sensitivity characteristics of photographic oscillographs with the convenience of a direct-writing instrument.

It records frequencies up to 2,000 cps. The sensitivity of its galvan-

ometers is comparable to that in photographic-type oscillographs, yet the record is instantly visible, readable and usable without further processing of any kind. No powder magazines or other processing material is required.

The instrument's 2,000 cps flat frequency response is achieved without "peaked" amplifiers or other compensation. No amplification is needed for most applications.

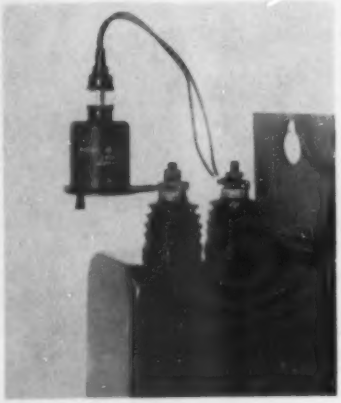
The Visicorder is suitable for almost every oscillograph application, and for additional uses where the measured phenomena need to be monitored, or where immediate recorded results are necessary or desirable.

The Visicorder accommodates as many as six channels on a six-inch chart. Its galvanometers deflect a full 6 inches peak to peak. Traces may overlap — they are not limited by adjacent channels. Chart speeds are 0.2, 1, 5 and 25 inches per second, minute or hour. The instrument accommodates 100 feet of record, it can be rapidly loaded in daylight, and has an indicator that shows the amount of unused record.

For additional data, ask for item U-1237, using the coupon on page 61.

Protective gap announced for series capacitors

THE SUCCESSFUL development of a protective gap for series capacitors used with distribution transformers has been announced by the General



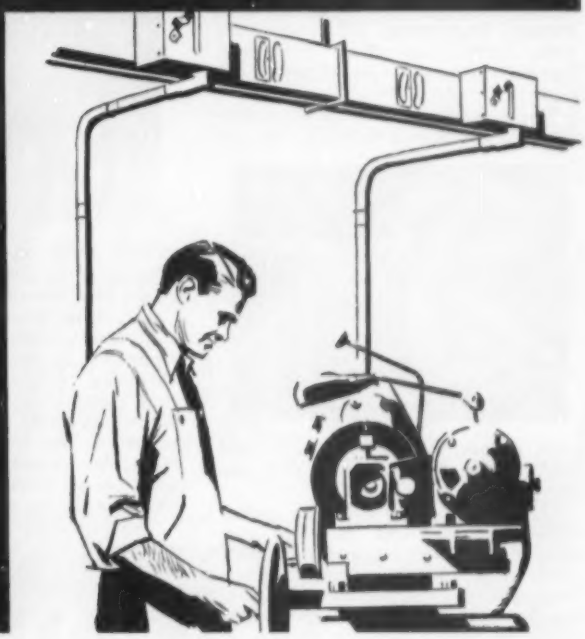
Electric Company Capacitor Department, Hudson Falls, N. Y.

The company expects to have the protective gap available sometime this fall. Field tests are nearing completion at the present time. An entirely new product, the gap is designed to prevent extreme voltages appearing across a series capacitor when abnormal current conditions occur, and to reinsert the capacitor into a circuit upon return to normal current conditions.

Series capacitors connected in the primary of distribution transformers economically solve the problem of starting moderately large single-phase motors on power systems. Five per cent impedance series capacitors with the protective gap provide nearly zero transformer regulation and freedom from sustained ferro resonance.

Utility companies have shown an

FORD SAVES OVER 3,000,000 POUNDS OF CRITICAL COPPER



...you, too, can save by using BULLDOG ALUMINUM BUStribution Duct

Five years ago, visionary plant engineers at Ford Motor Company were among the first to approve aluminum conductors as an alternate for copper in BullDog BUStribution® systems. This enlightened thinking has now led to a savings of over *3 million pounds* of copper by Ford . . . permitting this critical material to be diverted to defense and other areas.

But saving copper is just half the story. Pioneered by BullDog, BUStribution Duct with aluminum bus bars costs less initially . . . is easier to install . . . operates with top efficiency and safety. Its lighter weight reduces the strain on building trusses and supporting members . . . makes it easier to relocate when plant layout must be changed.

Follow Ford's lead. Install BullDog "Lo-X"® and Plug-in BUStribution Duct with aluminum conductors in your plants. It's the modern, economical way to get flexible, efficient power distribution—and help conserve America's dwindling copper resources, too. Consult a BullDog field engineer or write to BullDog Electric Products Co., Detroit 32, Mich.

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Houston, Texas

WILSON ELECTRICAL EQUIPMENT CO.
101 E. Maple St.
San Antonio, Texas

STANDARD ELECTRIC MFG. CO.
2401 Federal St., P.O. Box 1138
Dallas 1, Texas

WALKER ELECTRICAL CO., INC.
70 Bennett St., N.W., P.O. Box 8, Sta. D
Atlanta, Georgia

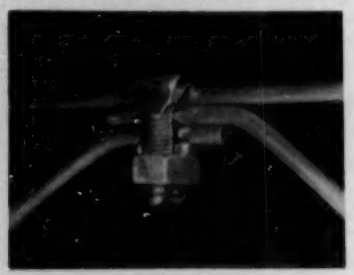
increasing interest in the application of series capacitors with distribution transformers. In general, such applications have been limited in the past by inherent technical problems.

For additional data, ask for item U-1238, using the coupon on page 61.

Three-wire Servits through #2 solid

TO MEET the needs of utilities and REA cooperatives using split-bolt connectors in three-wire applications, Burndy Engineering Co., Inc., Norwalk, Conn., has added three-wire Servits for conductors through #2 solid.

The new sizes of three-wire Servits are designated KS17-3, for #6



solid copper; KS20-3, for #4; and KS22-3, for #2. All have REA approval.

Three-wire Servits are forged split-bolt connectors of the same quality and performance standards as the rest of the Servit line. They include closely dimensioned threading for easy bolt starting and minimum frictional losses in tightening, and a flat-sided head for good wrench-gripping surfaces.

The Servit's strength permits high tightening torque to make secure connections. It is reusable and can take the same tightening torque in reuse as the first time.

For additional data, ask for item U-1239, using the coupon on page 61.

New aerial lift performs wide variety of operations

INTRODUCTION of a low cost, hydraulically operated aerial lift specifically designed for telephone line work is announced by The Sky-Worker Corp., 83 Ford Street, Milford, Conn.

Called the "Tele-King," the new aerial lift — thoroughly proved in actual telephone line work operations by two eastern telephone companies — performs a wide variety of operations including: cable patrol; placing of guys; placing of strand; placing of rings; placing of cable blocks; placing of cable; lashing of cable; placing of rural wire; placing of urban wire; placing of moulding or tree guards; placing of blasting guards; placing strand-mounted loading coil case; preparing cable for removal, cutting out sleeves, grade clamps and removing supports and terminals; removing aerial cable; removing open wire; removing cross arms; retensioning

strand; replacing defective or strapping out guy insulators; re-ringing of cable; tree trimming, etc.

The Tele-King, designed in close conjunction with leading telephone engineers, showed these results after extensive actual field operations: time required for operations in which it was used was cut, on the average, one-half; costs were cut one-third. Hazardous operations such as dismantlement work were carried out with greatly improved safety.

The Tele-King unit is truck-mounted. The length of its upper boom, specifically tailored to the requirements of individual telephone companies, permits easy maneuverability under the most rigorous operating conditions, while rotation of the booms is 400° — 40° past full circle. The material used for the coating of the outer boom, and for the crow's nest, has a guaranteed dielectric strength of 20,000 volts. (Actually, the material, before use, is factory tested at 40,000 volts). A winch, controlled from the crow's nest for tensioning strand, is included as part of the unit. So is a hydraulic reel loader which is reported to be completely revolutionary in itself. A two-way intercom system and proximity alarm are available as optional equipment.

For additional data, ask for item U-1240, using the coupon on page 61.

New interrupter switch designed for safety

DELTA-STAR Electric Division, H. K. Porter Co., Inc., 300 Park Ave., New York 22, N. Y., has just announced a new line of interrupter switches designated as the MKR-40 Powerupter. These new switches are designed to permit safe interruption of load, magnetizing, and charging currents up to 600 amperes, without danger of external arcing or flame.

They combine the features of a standard group operated vertical break switch and a newly designed interrupter of very rugged construction, without sacrifice of any switch design features or characteristics. Double acting mechanism assures instant arc extinction, either in opening or closing circuit.

The new Powerupter switch is available in voltage ratings from 7.2 to 34.5 kv, in continuous current ratings of 400, 600, 1200, and 2000 amperes.

The MKR-40 Powerupter is the result of several years of continuous research and testing to develop a fully controlled unit which would be extremely dependable, yet not sacrifice any of the operating or electrical features of the group operated switch. Laboratory and field tests indicate that at rated values interruption occurs in less than one cycle.

For additional data, ask for item U-1241, using the coupon on page 61.

Digital demand recorder tapes watt-hour demands

FISCHER & PORTER Co., Hatboro, Pa., announces the development of a digital demand recorder which automatically produces a punched tape record of watt-hour demands. The punched tape record can be read visually with ease or processed quickly by a Fischer & Porter automatic tape translator operating a card punch such as the IBM 526.

The new demand recorder was designed especially for, and in coopera-

tion with, the electric utility industry. Use of the demand recorder and automatic translator in load research work will allow electric utility management to get up-to-date information on system load characteristics rapidly and inexpensively. Use of the demand recorder in customer demand billing will allow completely automatic billing procedures.

The digital demand recorder operates from the standard contact making mechanism on the watt-hour meter. It is a completely electromechanical device with few close tolerances. It is, therefore, highly reliable and will meet the long life requirements of all electric utility metering equipment. It is accurate to ± 1 count in 400.

For additional data, ask for item U-1242, using the coupon on page 61.

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December, 1956

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News of the industry

edited for Southern readers

Contractors, builders meet for 11th session

ELECTRICAL contractors, building contractors, and representatives of banks and lending institutions have been meeting with representatives of the Potomac Edison Co., Hagerstown, Md., in the eleventh annual series of electrical contractor meetings.

These contractors' meetings were started ten years ago for the exchange of ideas and information related to the use of electricity in building and to keep electrical contractors and builders acquainted with the various changes in wiring codes, inspection requirements, equipment development, etc.

The current contractors' meeting was primarily devoted to the introduction of a proposed program growing out of suggestions made by the electrical contractors and developed with their cooperation by the electric company. Included in this program were: the introduction of three means of providing 200 ampere service entrances at reasonable cost; a proposed standard form for estimating residential wiring requirements; and a discussion of progress in the promotion of residential electric heat in this area.

One of the new, low-cost, 200 ampere service entrance devices was developed during the past year by electric company representatives working in cooperation with a number of manufacturers of electrical equipment. This innovation will offer substantial savings to builders while meeting all wiring specifications and provides increased electrical capacity for future use.

REA's reported financially sound

LOAN REPAYMENTS ahead of schedule by rural electric borrowers are nearly 350 times greater than payments in arrears, the U. S. Department of Agriculture's Rural Electrification Administration has announced.

Figures as of September 30 reveal the rural electric systems have gained to the strongest position in the 21-year history of the electrification program, with $98,858,886 in advance payments on loans, and only four borrowers delinquent for a total of $286,777. A year ago 12 systems were delinquent for a total of $467,831.

Complimenting the cooperatives on "attainment of economic and service maturity," REA Administrator David A. Hamil noted that the delinquencies amount to only about 1/100th of 1 per cent of the almost $2,800,000,000 advanced to borrowers for rural electrification.

"Working together, the cooperatives and REA have made record gains during the past several years toward financial strength and service dependability," Mr. Hamil said. "Use of electric power in rural areas is at an all-time peak, and power costs, both wholesale and to the farmer, are at all-time lows.

"We anticipate continued progress in these directions coincident with further improvement in the economic status of the rural electric cooperatives."

Quality lighting theme of Southwest IES talks

HOW TO OBTAIN quality in lighting by the use of modern materials, proper design and correct application was the subject of a recent series of talks before four

W. V. C. Foulks

Southwestern IES chapters by W. V. C. Foulks, vice-president in charge of Engineering and Chief Engineer, Curtis Lighting, Inc., Chicago.

Mr. Foulks spoke to the Tulsa chapter on November 19, the Oklahoma City chapter on November 20, Dallas and Fort Worth chapters at Fort Worth on December 3, and the Shreveport, La., chapter on December 4.

Mr. Foulks is a present member of the committee on School Lighting and recently was chairman of Committee on Lighting Education that conducted a nationwide survey of the employment potential for professionally trained illuminating Engineers.

Oklahoma utility group holds district sessions

THE EASTERN and Western District Conferences of the Electric Light and Power Division of the Oklahoma Utilities Association were held recently in Poteau, Okla., and Chickasha, Okla., respectively.

Both sessions heard talks on "Today's Sales Problems," by D. J. Frandsen, sales manager, Public Service Company of Oklahoma; "Industrial Development Problems," by Dr. Randall T. Klemme, director, Oklahoma State Department of Commerce and Industry; "Public Power Situation in the Southwest," by H. L. Branan, assistant to the president, Oklahoma Gas and Electric Co.; and "The Middle East and Strategic Material," by Dr. M. L. Wardell, professor of History, University of Oklahoma.

George Carter, Oklahoma Gas and Electric Co., is chairman of the Eastern District, and John B. Harris, Public Service Company of Oklahoma, is chairman of the Western District. A. J. Haswell, Oklahoma Gas and Electric Co., is Conference chairman.

Memphis to supply power at TVA consumer rates

THE CITY OF MEMPHIS will produce public power, without subsidy in the form of direct or hidden taxation or higher prices, at the same relative rates to consumers as have prevailed under the city's purchase of TVA power, Mayor Edmund Orgill announced recently.

This will be done, the Mayor told a press conference, by under-

This new Systems Operations Center of the Jersey Central Power & Light Company keeps in touch with remote stations through Bell System channels for telemetering and remote control.

Bell System communications help Jersey Central regulate power transmission

Colored pegs in wall diagram indicate segments of line to be isolated for maintenance work.

Channels for telemetering and remote control enable the Jersey Central Power & Light Company to regulate power transmission every step of the way from generator to home, store and factory.

An engineer glances at the dials, which give him a running picture of the system and the changing demands he has to meet—information which has been brought to him by Bell System telemetering channels.

From his position, he switches loads, starts and stops generators and localizes failures—even at distant points—over a network of remote control channels provided and maintained by the Bell System.

If you would like to know more about how Bell System communications can help you, an engineer will be glad to survey your company's needs. There's no obligation. Why not call your Bell Telephone representative today?

BELL TELEPHONE SYSTEM

Private Line Telephone, Private Line Teletypewriter
Channels for: Data Transmission, Telemetering, Remote Control, Telephotograph, Closed Circuit TV

taking a long-range financial program through 1965, the first phase of which will include building a huge new municipal steam electric plant, largest single project of its kind ever constructed by any community in the world.

The program also calls for purchase of certain TVA distribution facilities, construction of new substations and transmission lines and increases in electric facilities to take care of the greater load.

To finance the initial undertaking, the city is issuing approximately $154,000,000 worth of tax-exempt, electric revenue bonds. The mayor said these will be repaid within 35 years from Electric Division revenues, maintaining Memphis' normal, low electric rates and without special taxation.

The new plant will be located at Ensley Plantation on McKellar Lake, adjacent to a new harbor and industrial development area.

It will consist of three steam-electric, turbo-generator units, each with a nameplate rating of 250,000 kilowatts, to be constructed in sequence. The total net capability of the three units, which will serve the Memphis area including Shelby County, will be 812,500 kilowatts. The first unit is expected to be operative in the summer of 1958.

Lighting clinic series conducted by Sylvania

A SERIES OF fluorescent lighting clinics is being conducted by lighting specialists of Sylvania Electric Products Inc., in 11 major cities of the United States this winter.

A team of lighting specialists from the company's Lighting Division headquarters and from the company's sales districts, are participating in the clinics in the Midwest, Far West and South. Heading the group is Theodore C. Sargent, staff commercial engineer of fluorescent lamps, at division headquarters in Salem, Mass.

Demonstrations, discussions, and "trouble-shooting" sessions are being scheduled with local groups in each of the areas. Problems of installations, specifications, and design features of various types of fluorescent lamps and fixtures are covered in the meetings.

A feature of the clinics is a demonstration of Sylvania's newest fluorescent development, the VHO (Very High Output) lamp which provides more than twice the light-output of conventional fluorescent lamps. This new development, announced last July, is described as "a completely new fluorescent lamp development which goes beyond any previous achievements in high intensity fluorescent lamp sources."

The tour will be in the Atlanta area the week of January 21; in Charlotte, N. C., area, week of January 28; and Kansas City district, week of February 25.

A-C holds workshop for transformer distributors

ALLIS - CHALMERS Pittsburgh Works was host recently to personnel from ten of the company's transformer distributorships at classroom and shop sessions.

New developments and general features of oil-filled and dry-type distribution transformers were discussed and demonstrated by works engineers, and the distributors were acquainted with many of the sales tools available.

Among those attending the two-day affair were Ken Zenge, Gerald Bess and Dwain Wright, all of Phillips & Co., Columbia, Mo.; Stuart H. Dent, General Engineering Co., Jacksonville, Fla.; L. D. Sies, Jr., Sies Electric Supply Co., Chattanooga, Tenn.; W. W. Wise, Shealy Electric Wholesalers, Columbia, S. C.; W. E. Hardison, Braid Electric Co., Nashville, Tenn.; H. V. Horner, Rumsey Electric Co., Richmond, Va.; and H. B. Edwards, Rumsey Electric Co., Roanoke, Va.

Addressing the sessions for Allis-Chalmers were R. W. Beard, manager of sales; P. S. Castner, assistant manager of sales; A. L. Baxter, F. E. Sauerburger, J. C. Gass, F. O. Ayers, and J. C. Breth, application engineers; C. C. Blum, supervisor advertising department, all of Pittsburgh Works, and John Paul Jones, supervisor, distributor sales section, West Allis, Wis.

Southwest distributors hear industry problems

EXECUTIVES representing some 60 electrical wholesale distributing firms from Arkansas, Louisiana, Mississippi, Oklahoma, Texas and New Mexico — all members of the National Association of Electrical Distributors — met in The Commodore Perry Hotel, Austin, Texas, November 8th and 9th, to discuss national and local problems affecting the industry.

Chairman of the first session of the two-day meeting was Austin B. Watson, of the Watson Electric Supply Co., Dallas.

Chairman of the second session was T. C. Treadway, Jr., of the Treadway Electric Co., Inc., Little Rock, Ark.

Reports were made on N.A.E.D. activities and recent developments pertaining to the association's program and the national picture. An illustrated forum featured ways in

While on a Pittsburgh Works plant tour held in connection with workshop sessions for some of the company's transformer distributors, A. L. Baxter, extreme right, Allis-Chalmers application engineer, explains principles of new continuous wound coils to, left to right, Stuart H. Dent, General Engineering Co., Jacksonville; W. E. Hardison, Braid Electric Co., Columbia, S. C.; and J. T. Graham, A-C Jacksonville manager.

which the electrical distributor can improve his position and his relations with others in the electrical industry. A special feature was a report entitled, "A Logical Approach to Solving Current Management Problems."

Managers named for new plants

SQUARE D Company has named Walter Nollenberger as manager of a major new manufacturing plant to be built in Lexington, Ky., and Stephen Kovach as manager of a smaller regional assembly plant now under construction in Atlanta, Ga., it was announced by Gordon Patterson, president. Both plants are scheduled for completion in 1957.

Mr. Nollenberger has been chief manufacturing engineer of Square D's Distribution Equipment Division, with headquarters in the Detroit plant. He joined the company in 1945 as a tool and die designer and has successively held various production and administrative positions.

Mr. Kovach has been supervisor of the industrial engineering section in Square D's new Royal Oak, Mich., plant. A native of Detroit, he joined the company in 1947 as a senior clerk in the production engineering department and subsequently held various manufacturing and engineering posts, including a period in the company's Cedar Rapids, Ia., plant.

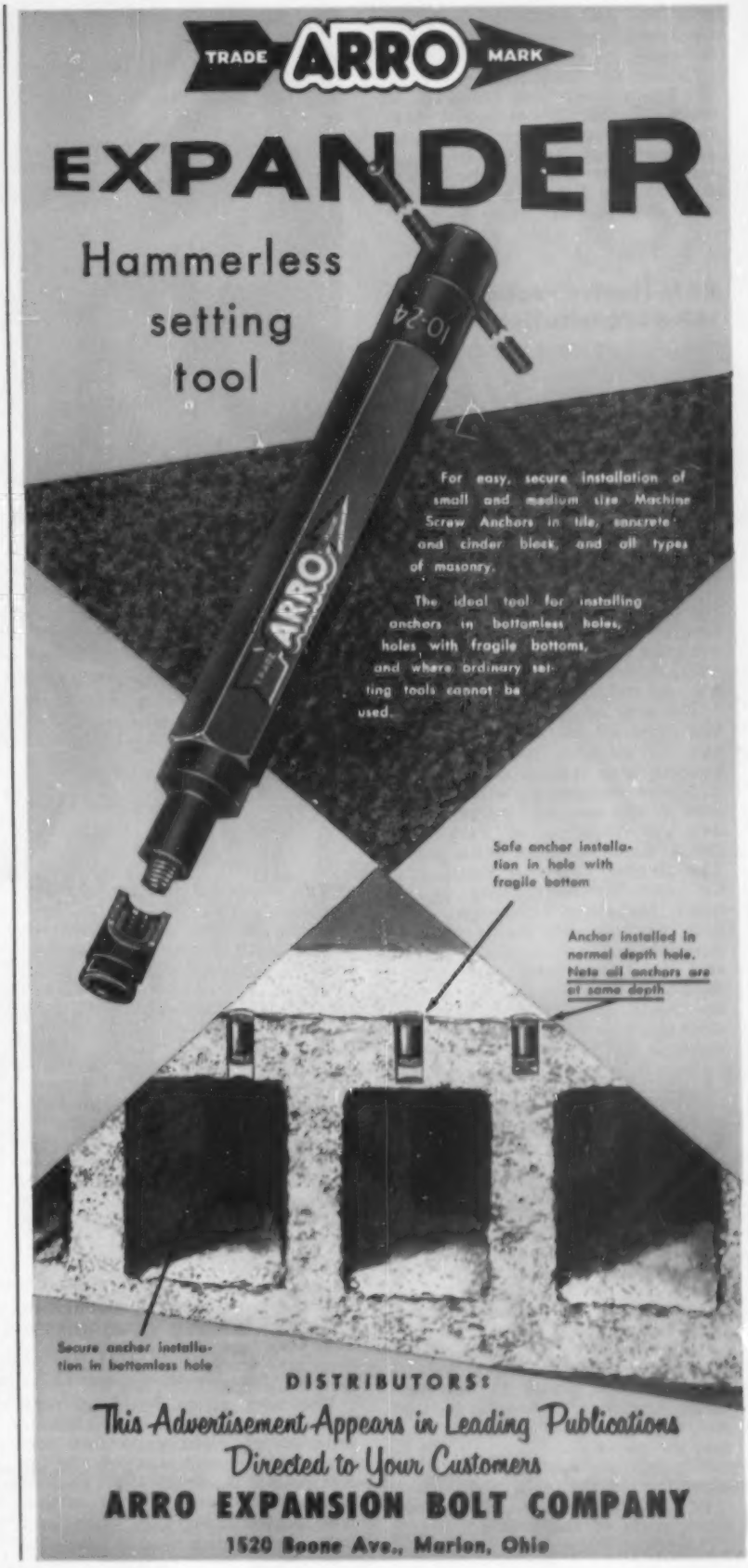
Tenth conference on protective relaying

PLANS have been announced for the Tenth Annual Conference for Protective Relay Engineers to be held at the Department of Electrical Engineering, A & M College of Texas, College Station, Texas, April 15-17, 1957. L. M. Haupt is conference chairman.

New southern agent appointed by Tork

FRED C. BALDRIDGE of New Orleleans, has been appointed sale representative for Tork Clock Company in Louisiana, Mississippi, western Tennessee and southern Alabama. The announcement by Dorset J. White, director of sales for Tork, emphasizes the fact that coverage in the area will be much improved, previously being covered from St. Louis, Atlanta, and Dallas offices.

Mr. Baldridge will give assist-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ance and counsel to the electrical, hardware and refrigeration distributors, as well as to the public utilities. Mr. Baldridge was with the Texas Power and Light Co., of Dallas, Texas, for five years, serving as assistant supervisor of power plants, sub-stations and transmission lines; and with the George E. Anderson Sales Agency as district manager, and later, partner.

R&M-Hunter realign sales organization

THE HUNTER Fan and Ventilating Company and the Fan Division of Robbins & Myers, Inc., are now operating as Hunter Division of Robbins & Myers, Inc., although products of the Memphis factory will continue to be marketed through trade channels and at consumer level under both Hunter and R&M brands. Several new products are being introduced by this firm for the 1957 season. These include new household fans handled by the retail dealer. It also includes several new ventilation products designed for marketing to the electrical contractor, residential builders and industrial plants.

The new alignment has created two sales divisions: window fans and all portable household fans bearing both Hunter and Robbins & Myers trademarks will be handled by the company salesmen under the direction of Parker T. Finch, formerly sales manager of The Hunter Fan and Ventilating Co. Installed ventilating equipment, including residential attic fans, kitchen vent hoods and industrial and commercial exhaust and circulating fans will be handled by a separate sales force under Keith M. Spurrier, formerly sales manager for the Fan Division, Robbins & Myers.

Brief news notes of manufacturers

AMERICAN BLOWER Corp., celebrating its 75th Anniversary this year, was recently honored in a special 16-page "American Blower Diamond Jubilee Edition" of The Dearborn Press, Dearborn, Mich.

"American Blower moved here from Detroit in 1935 and from that day has been proud to call itself a Dearborn industry. And we of Dearborn are proud to acknowledge American Blower as part of our economic and civic entity," said the paper.

The edition contained congratulatory messages from other Michigan firms as well as firms from other parts of the country.

American Blower has been a division of American-Standard since 1927.

* * *

THE NAME OF the Burndy Engineering Co., Inc., has been changed to Burndy Corporation, according to Marvin Lee, executive vice-president. Burndy has headquarters in Norwalk, Conn., and plants and warehouses in New York City; Milford, North Haven, and Stamford, Conn.; Chicago; Lynwood, Calif.; and Toronto, Canada.

Burndy recently reorganized its activities into two autonomous divisions. The U-I Division serves utilities and electrical construction and maintenance activities, while Omaton Division serves the original equipment, aircraft, and military markets.

* * *

PLANS TO re-locate its headquarters office in a new office building near metropolitan Detroit have been announced by Kuhlman Electric Co., Bay City, Mich.

The new office building, now under construction, is of Kuhlman's program of plant expansion and improvement, and is scheduled for completion in April 1957. It will house Kuhlman's general offices now located in Bay City, Mich., and will release much needed space for expanding the company's Bay City warehousing and manufacturing operations.

* * *

THE Pyle-National Co., of Chicago, announces that Equitable Equipment Co., 410 Camp Street, New Orleans 12, La., has been franchised to promote and sell Pyle-National turbines and turbogenerators for industrial purposes in the state of Louisiana, with the exception of Caddo, Calcasieu and Cameron parishes.

* * *

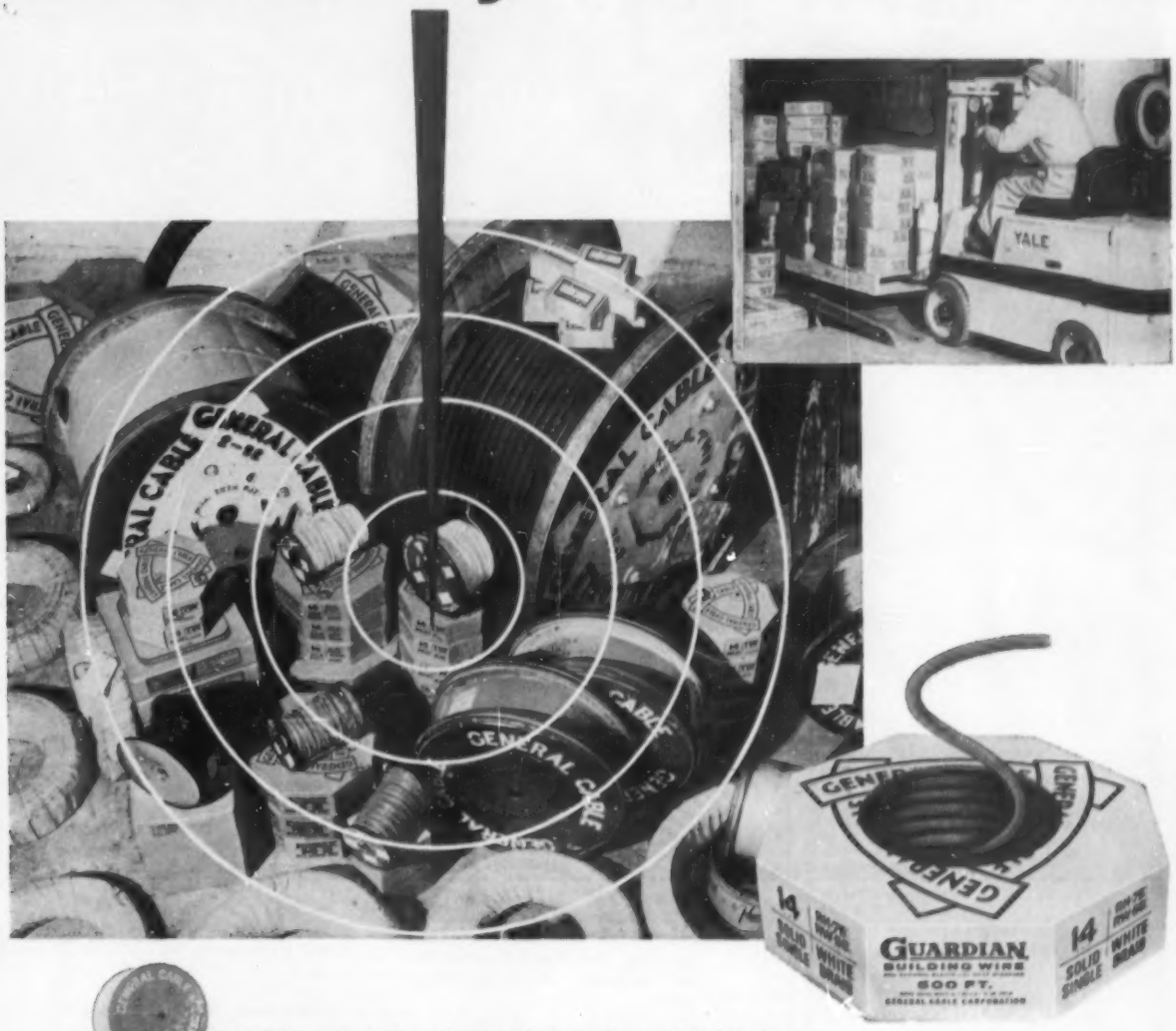
AN OLD familiar tradename in the electrical manufacturing industry has become the corporate name of a new subsidiary just established in the South. The new firm, Chromalox, Inc., of Murfreesboro, Tenn., takes its name from the famous line of electric heating equipment made by the parent company, the Edwin L. Wiegand Co., of Pittsburgh, Pa.

Officials present at a recent reception, held by the Murfreesboro Chamber of Commerce, were Ernest N. Calhoun, president of Chromalox, Inc.; Bruce A. Fleming, secretary; and John W. Bailey, manager of Industrial Relations.

Mr. Calhoun stated: "For some time we have been looking for new facilities to better serve our many

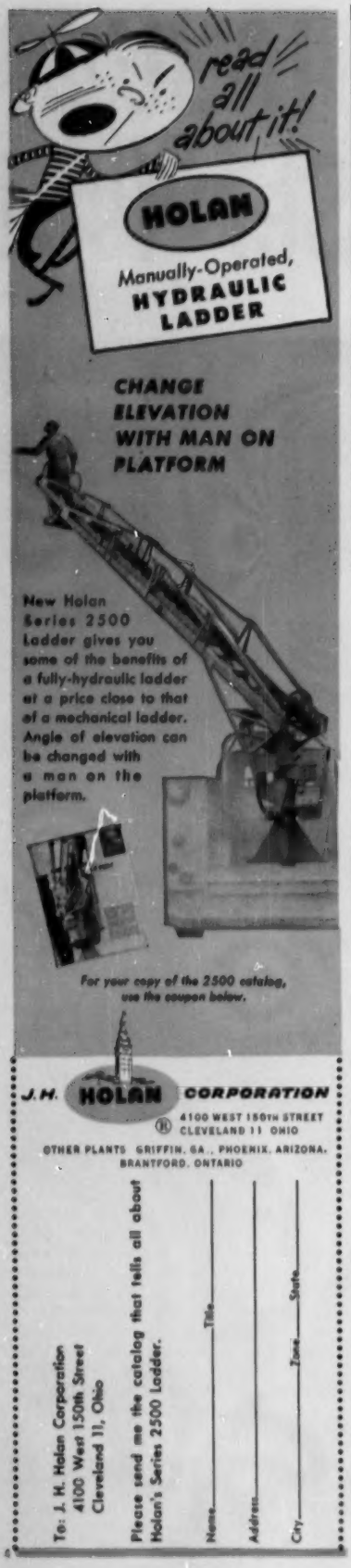
PARKING LOT LIGHTING SYSTEM—Modern, well-engineered outdoor lighting systems used to make busy streets safe for nighttime traffic can be, and often are, used by large shopping centers to ease their parking lot traffic problems. This night photo of Northland Shopping Center near St. Louis exemplifies the goals of a large parking lot lighting system: 1) even light distribution, with a minimum of shadow; and 2) attractive appearance to complement architectural design. The 40-acre, 5000-car parking lot is lighted with 400-watt, 20,000-lumen E-HI mercury vapor lamps, 324 twin-mounted L-M Ovalite luminaires on 30-foot steel standards.

GENERAL CABLE HITS THE TARGET on Delivery and Service!



Making your job easier and better, General Cable backs up distributors unconditionally with 'round-the-clock support, hits the target with quick delivery and dependable service on every job. GENERAL CABLE CORPORATION, 420 Lexington Avenue, New York 17, New York. Offices and Distribution Centers Coast-to-Coast.

be specific . . . **specify GENERAL CABLE**


read all about it!
HOLAN
Manually-Operated,
HYDRAULIC
LADDER
CHANGE ELEVATION WITH MAN ON PLATFORM
New Holan Series 2500 Ladder gives you some of the benefits of a fully-hydraulic ladder at a price close to that of a mechanical ladder. Angle of elevation can be changed with a man on the platform.
For your copy of the 2500 catalog, use the coupon below.
J.H. HOLAN CORPORATION
4100 WEST 150TH STREET
CLEVELAND 11 OHIO
OTHER PLANTS GRIFFIN, GA., PHOENIX, ARIZONA, BRANTFORD, ONTARIO
To: J. H. Holan Corporation
4100 West 150th Street
Cleveland 11, Ohio
Please send me the catalog that tells all about Holan's Series 2500 Ladder.
Name
Title
Address
City
Zone
State

customers in the growing South. We looked at various locations and found what we considered to be an ideal location in Murfreesboro. The city is well located as to transportation, truck routes and air travel. It has excellent educational facilities and a fine reputation as a good place in which to live and to work."

Johan Wetlesen will be the new general manager of Chromalox, Inc., assisted by Gus Weiss as production manager and William Wolf in charge of tooling and equipment. Fred Ezell of Murfreesboro has been employed as personnel manager.

The company has just completed moving a wholly owned subsidiary, Pre-Fab, Inc., from Wisconsin to Murfreesboro and is beginning immediately the manufacture of band type elements for electric water heaters.

* * *

A $2,000,000 EXPANSION program has been announced by I. R. Rosenblatt, president, Globe Lighting Products, Inc. 200,000 square feet will be added to the firm's Brooklyn plant which has a present area of 240,000 sq. ft. Globe also maintains a plant for the manufacture of commercial lighting fixtures in Los Angeles.

A feature of the new plant addition will be the introduction of automation equipment to simplify production of newly designed lighting fixtures. Much of the capital investment will go toward improved facilities and production equipment. Also a part of the new space has been leased by special arrangement to an industrial tenant.

* * *

THE OFFICE of G & W Electric Supply Company is now located at 3500 W. 127th St., Blue Island, Ill. The company completed the move in mid-November.

* * *

A SERIES OF special "Lighting Shows" is being staged in major cities across the country by the Prescolite Manufacturing Corporation to introduce its latest designs in commercial and residential lighting fixtures.

Architects, engineers, and executives in the building industries in each area are being invited to attend the shows, which include a presentation of Prescolite's new color movie, "A World of Light." The company's new, five-color product literature is also being introduced for the first time in conjunction with the shows. Southern cities in which the shows are being held include Houston, Miami, and Atlanta.

* * *

REPUBLIC Steel Corporation has announced plans for a major expansion of its Steel and Tubes Division plant at Ferndale, Mich., to provide space and equipment for the production of "Electrunite" light wall conduit tubing.

The erection of a new building and purchase of new equipment

Dates Ahead

American Institute of Electrical Engineers, Winter Meeting, Hotel Statler, New York, N. Y., Jan. 21-25, 1957.

Southeastern Electrical Wholesalers Association, Seventh Annual "Industry Day" Meeting, Atlanta Biltmore Hotel, Atlanta, Ga., Jan. 24-25, 1957.

Missouri Valley Electric Assn., Industrial and Commercial Sales Conference, Hotel President, Kansas City, Mo., Jan. 31-Feb. 1, 1957.

National Association of Purchasing Agents, Public Utility Buyers' Group, 26th Annual Mid-Winter Conference, Brown Hotel, Louisville, Ky., Feb. 3-5, 1957.

Air Conditioning, Ventilating and Electric Space Heating Exposition, Sheraton Park Hotel, Washington, D. C., Feb. 8-10, 1957.

The Electrical Trade Conference and Exposition, Shoreham Hotel, Washington, D. C., Feb. 12-14, 1957.

Southern Safety Conference and Exposition, John Marshall Hotel, Richmond, Va., March 3-5, 1957.

Oklahoma Utilities Association, Annual Convention, Tulsa Hotel, Tulsa, Okla., March 28-29, 1957.

Southeastern Electric Exchange, 24th Annual Conference, Boca Raton Hotel & Club, Boca Raton, Fla., April 1-3, 1957.

Protective Relay Engineers, Tenth Annual Conference, A & M College of Texas, College Station, Texas, April 15-17, 1957.

HERE'S WHY

CERTIFIED CBM CERTIFIED by ETL BALLASTS

ENJOY A PREFERENCE OF NEARLY 2 TO 1

In 1955, nearly 2 out of 3 HPF ballasts were CERTIFIED CBM BALLASTS.

There is just one reason for this preference:

CERTIFIED CBM BALLASTS assure more satisfactory and economical fluorescent lighting.

Built to exacting specifications that provide the precise electrical needs of fluorescent lamps, and periodically checked by Electrical Testing Laboratories, Inc., CERTIFIED CBM BALLASTS are your assurance of:

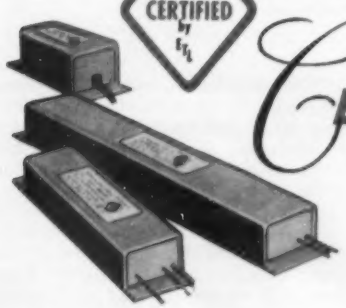
RATED LIGHT OUTPUT • RATED LAMP LIFE
LONG BALLAST LIFE • TROUBLE-FREE OPERATION
FREEDOM FROM NOISE

. . . all contributing to better lighting, lower maintenance cost and more economical fluorescent operation.

*Total ballast sales from U. S. Dept. of Commerce. CERTIFIED CBM BALLAST sales from ETL reports.

Send for free booklet, "Why It Pays to Use CERTIFIED CBM BALLASTS in Fluorescent Lighting Fixtures".

CBM CERTIFIED by ETL



CERTIFIED BALLAST MANUFACTURERS

2116 KEITH BUILDING • CLEVELAND 15, OHIO

Seven of the country's leading manufacturers of ballasts make CERTIFIED CBM BALLASTS. Participation in CBM is open to any manufacturer who wishes to qualify.

may cost some $3 million, T. F. Patton, president of the nation's third largest steel company, said.

"The demand for Republic's electrical metallic tubing has been very strong in the Midwest," Patton explained. "It is gaining increasing acceptance in the construction field as conduit for electric wiring, and all prospects point to continuing growth in this direction."

Because of its location in the heart of this area, the Ferndale plant, located just outside Detroit, was chosen for this expansion.

* * *

BROAD reorganization of the 35-year-old Tork Clock Co., Inc., first American manufacturers of time switches, was announced by Cyril J. White, president. To the general public, the only revealing factor of change is the adoption of the new name, Tork Time Controls Inc., a title more symbolic of the purpose of time switches. But it's far more than a change in name.

According to Mr. White, accompanying the name change is an entirely new outlook for the company. First indication is the enlargement of the board of directors to include new members who will contribute to the progressive development of Tork. The new 5-member board consists of Arthur A. Berard, president of Ward-Leonard Electric Co.; Frank H. Foley, of the legal firm of Morgan, Bagg, and Persons; Fred E. Goldmann, first vice-president of the County Trust Co. (Westchester, N. Y.); Cyril J. White, president of Tork Time Controls Inc.; and Dorset J. White, vice-president and director of sales for the company.

A-C announces new distributor

THE TENNESSEE Valley Electric Supply Co., 296 Adams Street, Memphis, has been named a distributor for Allis-Chalmers transformers in the area comprising the company's Memphis district territory.

L. E. Salmon is president and Harold E. Sartin is sales manager of the supply firm, which was established in 1934.

Announcement is also made that the Electrical Equipment Co., 101 West Main Street, Richmond, Va., a "Texrope" V-belt drive distributor for that city's industrial trading area since 1930, has had its franchise extended to include Allis-Chalmers motor sales. The equipment concern is now also a certified service shop for Allis-Chalmers motors and controls.

News about people

Two changes in the top management of **The Southern Company** were announced recently by **E. A. Yates**, chairman of the board. **C. B. McManus**, president, was named vice-chairman of the board. He was succeeded as president by **Harllee Branch, Jr.**, president of the Georgia Power Company. Mr. Yates continues as chairman. The changes will be effective January 1.

Mr. McManus, in addition to the usual duties of vice chairman, will

C. B. McManus

continue to exercise his responsibilities in connection with operating problems. Mr. Branch, as president, will have general direction of the company's affairs, Mr. Yates said. He pointed out that both Mr. McManus

Harlee Branch, Jr.

and Mr. Branch have had wide experience in Southern Company affairs.

Mr. McManus first became associated with the Alabama Power Company in March, 1917, and served in engineering and managerial capacities with that company before joining the Georgia Power Company in 1927 as assistant operating manager. He was appointed assistant to the president and elected to the board of directors of the Georgia company in 1945.

Two years later Mr. McManus was elected vice-president and director of operations and was elected president in 1947, upon the death of Preston S. Arkwright, Jr. He was elected a director of The Southern Company in 1949 and president in 1950. He continued as president of the Georgia Power Company until January, 1951.

Mr. Branch joined the Georgia Power Company in August, 1949, following 18 years of association with the company as one of its general counsel. He was elected vice-president and general manager and a director at that time. In January, 1951, he was elected president, suceeding Mr. McManus. He was elected a director of The Southern Company in 1953. He was born in Atlanta and was graduated from Davidson College and Emory Law School.

Other officers of The Southern Company are **J. M. Barry**, of Birmingham, chairman of the executive committee; **James F. Crist**, of Birmingham, vice president; **T. H. Vaden**, of Atlanta, vice president; and **L. H. Jaeger**, of New York, secretary and treasurer.

John B. Deck, Jr., lighting specialist for Texas Power & Light Co., has been installed as new chairman of the **Illuminating Engineering Society's Southwestern Section.**

Other officers installed at a recent dinner meeting in Dallas were vice-president, **Thomas L. Moore**, of **Fischbach & Moore of Texas, Inc.**, and secretary, **E. L. Cole**, of the **Dallas Power & Light Co.**

Mr. Deck served as the section's secretary for two years and held the position of vice-president for a year.

Newly elected members of the Southwestern Section's board of managers are John E. Metzenthin, Crouse-Hinds Co.; Arnold M. Gaynor, Gregerson & Gaynor, consulting engineers; Charles Shearer, Graybar Electric Co.; and Dr. O. Reynolds Young, optometrist.

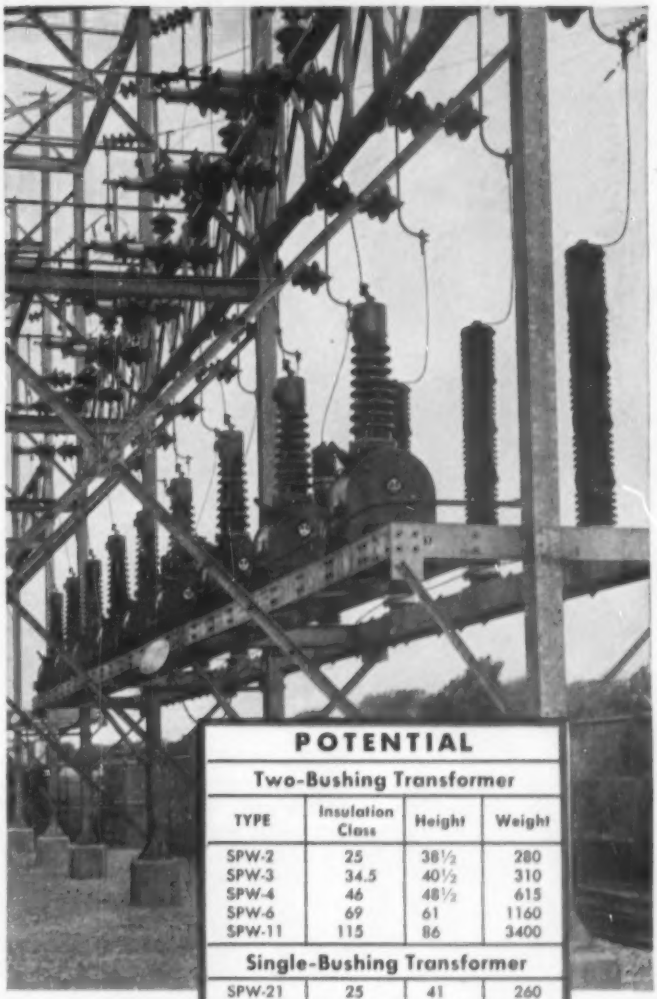
Three new men, including a vice-president in charge of sales, have been appointed to **Holan Corporation of Georgia**, Griffin, Ga. The announcement was made by J. Howard Holan, president of J. H. Holan Corp., Cleveland.

Robert R. Rector is the new sales vice-president. He comes to Holan from McCabe-Powers Auto Body Company where he was a [illegible] thern

[illegible] sales representative for six years.

So Light...SO COMPACT

So *Easy* to Install



MUCH smaller and lighter than previous designs, new Allis-Chalmers potential transformers cut installation costs and provide maximum handling convenience. Less space and less foundation to mounting structure are required. A fork truck or block and tackle is all that is needed to lift these 69-kv units into position. And, of course, relocating is accomplished just as easily.

Performance has also been improved in both ratio and phase angle with the advanced design of Allis-Chalmers potential transformers.

Many other design features — features that assure unparalleled dependability and long life — have been incorporated in these modern units. Get the complete story from your local A-C representative or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wis.

POTENTIAL

TYPE	Insulation Class	Height	Weight
Two-Bushing Transformer			
SPW-2	25	38½	280
SPW-3	34.5	40½	310
SPW-4	46	48½	615
SPW-6	69	61	1160
SPW-11	115	86	3400
Single-Bushing Transformer			
SPW-21	25	41	260
SPW-31	34.5	44¼	285
SPW-41	46	50¾	460
SPW-61	69	63¾	950
SPW-111	115	92	2310
SPW-131	138	112	3510

New Ratings have been added to the Allis-Chalmers line of potential transformers to include higher voltage insulation classes.

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

A-5164

the new
complete source
of information on
fine FANNER
Superformed
LINE CONDUCTOR
ACCESSORIES
the new
FANNER CATALOG
Fine Fanner
Superformed
THE FANNER MANUFACTURING COMPANY
This new FANNER Catalog illustrates and describes the wide range of Superformed Line Conductor Accessories . . . gives selection tables, application data and suggested installation methods. Get acquainted with this catalog now so that when you need accessory items for overhead distribution and transmission lines, you can take advantage of the many extra features of Fine FANNER Superformed products. Each product in the FANNER Superformed line is precision manufactured to install easier and perform better on the job. Careful packing insures safe delivery and simplified storage. Highest quality materials provide long life regardless of the type of installation. With all their extra features, FANNER Superformed products cost no more than ordinary products.
For the latest data on line conductor accessories — information that will be of exceptional value to you, write for the new FANNER Catalog EP6 today!
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THE FANNER MANUFACTURING CO.
Electrical Products Division
Brookside Park • Established 1894 • Cleveland 9, Ohio
AGENTS AND DISTRIBUTORS IN PRINCIPAL CITIES

sales representative for six years. Prior to that, Mr. Rector was affiliated with American Coach & Body in Cleveland.

Two new salesmen are **Walter G. Roberson** and **James Johnson.** Mr. Roberson, who formerly worked for

Walter G. Roberson

Murphy Body Works, Wilson, N. C., attended Wake Forest College and Atlantic Christian College. He is serving Holan customers in Georgia, Tennessee and Arkansas.

Mr. Johnson a former Florida resident, has been a McCabe-Powers field representative in Northern Illinois and Wisconsin for two years. He attended Northwestern University. His sales area will include Florida, Alabama and Mississippi.

Continuing as a fourth salesman in the Holan southern operation is **M. O. "Bud" Rowe,** who resides in Dallas, Texas, and handles Texas, Louisiana and Oklahoma.

Kuhlman Electric Company has named **Joel H. Watkins** as vice-president in charge of sales and **Arthur V. Hughes** as vice-president and director of engineering.

Mr. Watkins, a graduate engineer of the University of Virginia and a

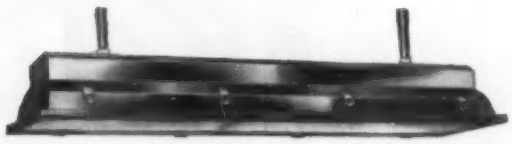
Joel H. Watkins

member of AIEE, began his electrical career in 1934 as a student engineer with the General Electric Co. After serving as vice-president of a Virginia consulting firm, Mr. Watkins

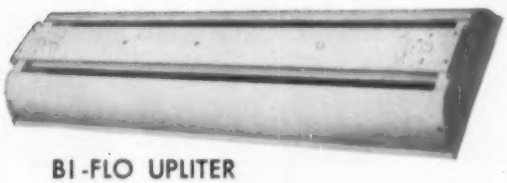
HOWEVER YOU MEASURE YOUR LIGHTING REQUIREMENTS

there's a *Wheeler* fixture for every job

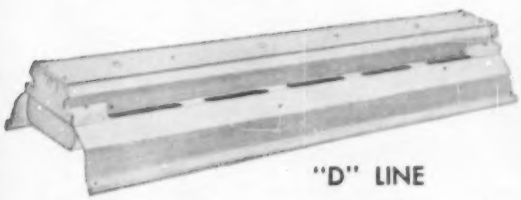
In industry after industry, on job after job, Wheeler's wide range of fixtures and features insures peak efficiency for practically every lighting requirement. Shown here: three outstanding examples of Wheeler's tremendous line of industrial lighting fixtures.



DUST-TIGHT • VAPOR-TIGHT



BI-FLO UPLITER



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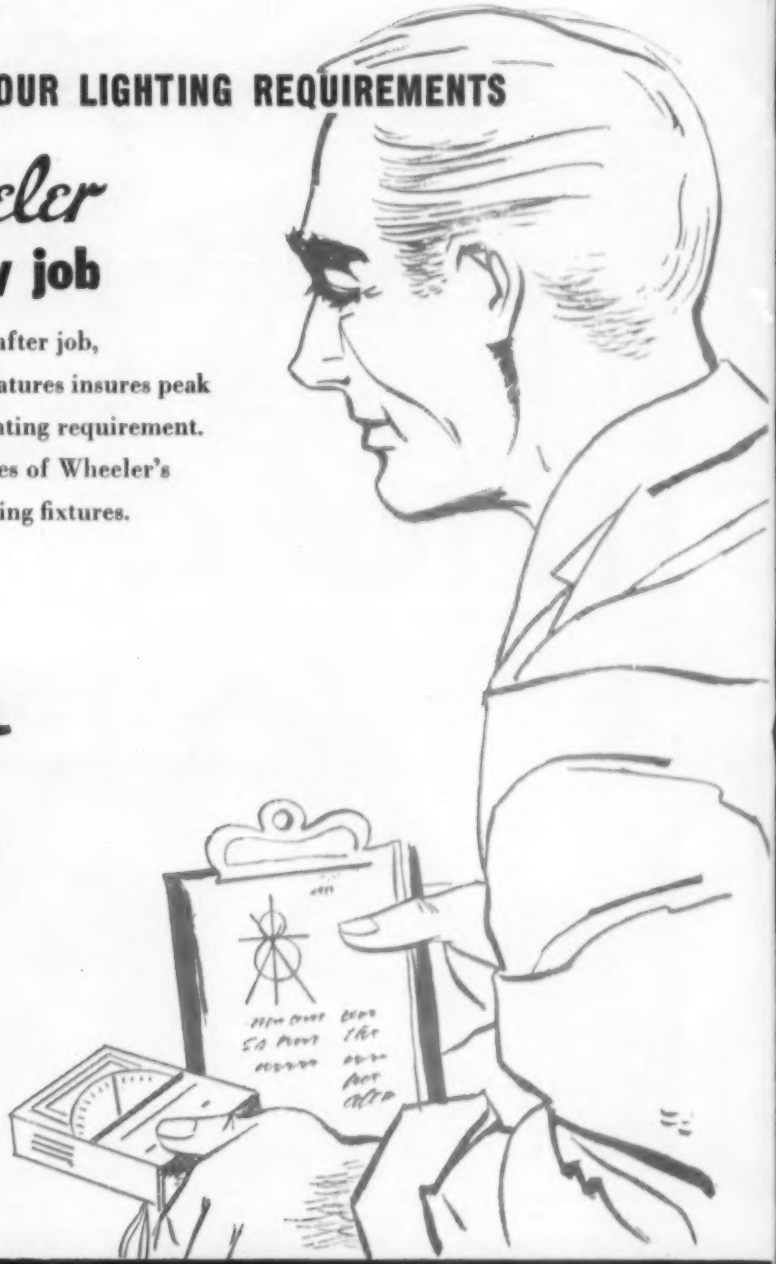


There's a Wheeler Incandescent or Fluorescent Lighting Fixture to meet every industrial requirement.

Wheeler Reflector Company

275 Congress Street - Boston, Mass.

Distributed Exclusively through Electrical Wholesalers

Certified Lighting for a Better America

75th Anniversary 1881-1956

joined Kuhlman Electric in 1953 as sales manager.

As vice-president in charge of sales, Mr. Watkins will continue to head the sales activities of Kuhlman's three regional plants at Bay City, Mich., Crystal Springs, Miss., and Salinas, Calif.

Mr. Hughes received his Bachelor of Science Degree in electrical en-

Arthur V. Hughes

gineering in 1937 and Master of Science Degree in 1938, both from the Massachusetts Institute of Technology, Cambridge, Mass. He joined Kuhlman in 1951 as director of engineering. Prior to this appointment Mr. Hughes served in Research Engineering at Battelle Institute, Transformer Development Engineering for Westinghouse, and Test Engineering for General Motors and General Electric.

As vice-president and director of Engineering Mr. Hughes will continue to coordinate product development and engineering research for Kuhlman's three transformer divisions.

Glenn L. McDuffie has been appointed Southwest district manager for **Southern States Equipment Corp.**, Hampton, Ga. **Roy McCowen,** district representative for Southern States, has been assigned a new territory and will operate from the home office.

Prior to this appointment, Mr. McDuffie served as district representative operating from the factory in Hampton. His new location will be Dallas, Texas.

Prior to this reassignment, Mr. McCowen was located in Dallas, Texas.

Charles W. Ashby, for several years an engineering sales representative in the southeast for prominent electrical manufacturers, has been appointed sales representative for **S&C Electric Co.,** Chicago, Ill. He will represent the company in the states of Alabama, Tennessee, and northwest Florida, with headquarters in Birmingham, Ala.

A Virginian by birth, Mr. Ashby is an electrical engineering graduate from the University of Virginia. Following graduation, he served the Line Material Company for a number of years as a field engineer, later becoming a sales representative for Burndy.

The appointment of **Bernard E. Lenehan** as consulting engineer for the **Westinghouse Electric Corporation's** meter division has been announced by **James M. Wallace,** division manager.

Mr. Lenehan, who has been serving as advisory engineer on long-range developments, will act as consultant to all departments of the meter division in Newark, N. J. and at Raleigh, N. C. A graduate of the Carnegie Institute of Technology, he joined Westinghouse in 1921 and has spent his entire career with the company in the field of measurements. He has been granted 50 patents on electrical measurements, and is author of several technical papers.

Arthur J. "Bud" Gambs, Jr., has joined **Day-Brite Lighting, Inc.,** as sales promotion manager. His new as-

Arthur J. Gambs, Jr.

signment will include responsibility for product promotion, exhibits and trade shows, and special promotional activities with distributors and electrical contractors.

Mr. Gambs formerly was manager of Inside Construction Sales for Graybar Electric Co., Cincinnati. During his eight years with Graybar, he worked with lamps and lighting, and in the latter years, directed the sales promotion activities for the Supply Department of the Ohio Valley District.

L. M. Grawemeyer, vice-president in charge of Sales, **The Miller Company,** has announced the addition of **George Patterson** as sales representa-

George Patterson

tive for the Memphis territory. The Memphis territory consists of Memphis and Jackson, Tennessee; Paducah, Kentucky; and Little Rock, Arkansas.

Prior to Mr. Patterson's association with The Miller Company, he was a supply salesman for the Westinghouse Electric Supply Company in Knoxville, and prior to that, General Electric Supply Co., also in Knoxville.

Several additions and changes in the Southern sales staff for **Nutone, Inc.,** have been announced by L. B. Dreifus, vice-president and Eastern sales manager.

Additions to the sales staff include **Howard V. Garrett,** Atlanta, and **George T. Lewis,** Jacksonville. **George Foster** is now senior repre-

George Foster

George T. Lewis

Howard V. Garrett

Familiar symbols of safety

PROTECTION IN THE AIR

FOR YOUR WIRING PROTECTION

Standard-threaded rigid steel conduit is the only wiring system approved today by the National Electrical Code as moisture-, vapor-, dust- and explosion-proof for use in hazardous locations and occupancies.

Youngstown Buckeye full-weight rigid steel conduit is the answer to all problems of safe and efficient functioning of your electrical wiring systems in any type location. On the job, you will find it's easier to fabricate—easier to fish wires through—and above all, Buckeye Conduit will save you money because its excellent corrosion resistance always provides a much longer, untroubled service life.

Remember, because Youngstown is the only producer of rigid steel conduit controlling all processes from ore mining to bundling the finished product, you can be certain each length contains the same high quality that has made it the accepted standard of owners, architects and contractors everywhere.

Ample stocks of our distributors will keep your jobs on schedule—and cover emergency needs whenever they arise. Call today for that famous quality and service built into every Youngstown product.

Ask your distributor for Youngstown Buckeye Full Weight Rigid Steel Conduit and Youngstown Electrical Metallic Tubing.

THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yoloy Steel

General Offices - Youngstown 1, Ohio

District Sales Offices in Principal Cities

it's a Snap!

to make PERFECT insulated splices

One-piece snap-on Nylon Splice Cap Insulators assure quickly-applied splice insulation—even in extremely cold weather, even on very flexible wire.

For use on Buchanan Splice Caps for 2 #18's thru 3 #8's or 2 #6's, as installed with the Buchanan C-24 pres-SURE-tool—same tool terminates from 1 #16 thru 1 #8 with only one size Termend® Lug.

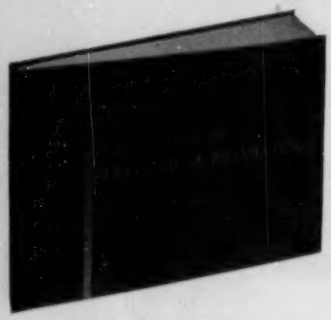
Insulators are approved for 600 volts on building wire, 1000 volts in fixtures—in applications to 105°C.

FAST SURE LOW INSTALLED COST

Ask your distributor or write for Bulletin EC11

BUCHANAN
ELECTRICAL PRODUCTS CORPORATION
HILLSIDE, NEW JERSEY

IN CANADA / Gasaccumulator Co. (Canada) Ltd., 12 Gower St., Toronto 16, Ontario



NEW 1956 EDITION
JUST OFF THE PRESS

ELECTRICAL ESTIMATING GUIDE

Covers Over 2000 Wiring Jobs

This new, entirely different estimating guide has 175 completely worked out charts.

Authentic, Time Saving—Easy to Use

This book is easy to use—it has no complicated mathematics or formulas to work over. You merely determine the nature of the wiring, check it in the BLUE BOOK OF ELECTRICAL ESTIMATING and there's your answer—it's the simplest estimating book ever written.

FREE NATIONAL ELECTRIC CODE BOOK
Just For Examining Blue Book

This book was written by a successful electrical contractor and estimating engineer with over 20 years' experience. It has an entirely different method of determining estimates on wiring jobs. Electrical contractors, journeymen, architects, and engineers will find use for this book every day. Gives time required to do jobs along with complete labor charges in every state in the country. Order this book now at special introductory price of $7.75. As a special offer to Electrical South readers the publishers give a free copy of the latest National Electrical Code Book just for examining the 1956 Blue Book of Electrical Estimating.

ESTIMATING HANDBOOKS ASSOCIATES — DE KALB, ILL.

Send me the NEW BLUE BOOK OF ELECTRICAL ESTIMATING and the latest edition of the National Electrical Code Book for 5 days free trial. I understand I may return the book within 5 days and owe nothing. If I keep it I will pay $7.75 plus postage for shipping. I keep the Code Book FREE even if I return the Blue Book of Electrical Estimating.

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ADDRESS

TOWN ZONE STATE

☐ I enclose $7.75 to save shipping cost.
☐ Send C.O.D. I'll pay postman $7.75 plus C.O.D. fee on delivery.

December, 1956

sentative for South Carolina.

Nutone has also reorganized the Florida sales staff. In addition to **Ed McKay,** Tampa, sales manager for Florida and Georgia, other Florida representatives include **"Red" Zahler,** Miami, **Tom Tarpley,** Tampa and St. Petersburg, and newcomers George Lewis working out of Jacksonville and Howard Garrett working out of Atlanta.

Les Meil, Birmingham, now covers Pensacola, Fla., and the state of Alabama, and **Bill Menchaca,** Nashville, is representative for eastern Tennessee.

Appointment of **Frank Brady** as head of **National Electric Products Corporation's** newly created Houston

Frank Brady

District was announced recently by vice-president in charge of sales R. C. Bennett, Jr. Before his present appointment, Mr. Brady was New York City district manager. He had previously served as Atlanta district sales manager.

Mr. Brady has been with National Electric Products Corporation since 1946. He is a 1934 graduate of Georgia Institute of Technology.

G. L. Roberts, vice-president of **Simplex Wire & Cable Co.,** Cambridge, Mass., has announced the appointment of **Thomas H. Marsh** as advertising manager. Mr. Marsh has been with the company since 1951, and replaces the late **E. J. MacKenzie.**

John Kott, Jr., has been appointed sales manager for **J. H. Holan Corp.,** Cleveland, Ohio.

The new sales manager, formerly assistant sales manager at Holan, worked in production, engineering and purchasing at American Coach and Body for 17 years before coming to Holan in 1950. He attended Fenn College in Cleveland.

In his new position, Mr. Kott will supervise sales of utility bodies and associated power equipment for the J. H. Holan plant in Cleveland.

The directors of **Pittsburgh Reflector Company** announce the appointment of **Robert C. Zinsmeister** as president of the firm. He will make his headquarters at the company's executive offices in Pittsburgh.

Prior to his present appointment, Mr. Zinsmeister was the plant manager of the company's Irwin, Pa., plant. He first became associated with Pittsburgh Reflector Company in 1945 in the purchasing department.

Robert C. Zinsmeister

In 1949 he became purchasing agent, then assistant secretary and treasurer of the firm. He was elected to the board of directors in 1953. Mr. Zinsmeister attended Michigan State College, then served in the Air Force during World War II. He is a member of the Illuminating Engineering Society, the Western Pennsylvania Electric League, and active in many other organizations devoted to the science of lighting.

At the same time, to round out its management team, the board of directors appointed **Donald J. O'Neil** as assistant secretary and assistant treasurer. Mr. O'Neil has been with Pittsburgh Reflector Company for the past eight years as a cost accountant and assistant to the executive vice-president. He is a graduate, in Business Administration, of Duquesne University and is an associate member of the Illuminating Engineering Society.

Anderson Connector Corp., a subsidiary of Anderson Electric Corp., of Birmingham, Ala., has opened offices in Pittsburgh in the Malady Building, at 4135 Brownsville Road.

Commenting on the opening of this new subsidiary, **R. E. Schuler,** president of Anderson Electric Corp., said, "For some time we have been making a study of means to better serve our manufacturers in the tri-state area, comprising West Virginia, Western Pennsylvania, and Ohio. The catalogued and custom connectors and clamps offered by Anderson necessitate constant contact with manufacturers from the product development stage to actual delivery of

One dependable quality

Monarch
RENEWABLE FUSES

From raw material to final inspection every part is MADE *and* ASSEMBLED *under our own* QUALITY CONTROL

STRATEGICALLY LOCATED
WAREHOUSE STOCKS

Monarch
ELECTRIC CORPORATION
Jamestown, New York

Make any type of conduit bend faster & easier

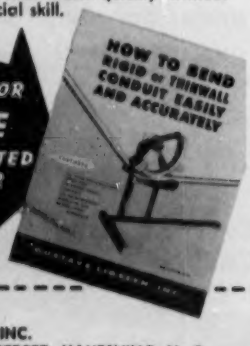
EXCLUSIVE CALIBRATED DEGREE SCALE ASSURES YOU OF ACCURATE BENDS EVERY TIME

NO CHANGING PARTS
These are complete machines of all steel construction. No loose parts to be misplaced or lost. Machines are always in readiness to bend conduit easily and accurately.

RUGGED...LOW MAINTENANCE
Designed for real outdoor work. Machines incorporate a simple but powerful toggle-ratchet mechanism that requires no maintenance other than an occasional drop of oil. Rugged stand with built-in square and scale gives solid support at a comfortable working height.

FASTER, SIMPLE TO USE
You get perfect, smooth uniform bends every time. Repeat bends and 180° bends are simple, easy to make. You turn out professional work quickly without special skill.

WRITE FOR **FREE** ILLUSTRATED FOLDER



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O. LIDSEEN, INC.
1090 FIRST STREET, HAYESVILLE, N. C.

NAME_____

COMPANY_____

ADDRESS_____

CITY_____

the products. Our new subsidiary office will improve our ability to serve customers both old and new. We will be in a much better position to assist in design problems where our products have an application."

C. B. Early is president of Anderson Connector Corp. Mr. Early was formerly president of the Burns Electric Co., Pittsburgh.

Binkley Mfg. Co., Warrenton, Mo., has announced the appointment of **Owen W. Hetzler** as manager of the Utilities Division with headquarters in Warrenton, Mo.

Mr. Hetzler comes from Kansas City Power & Light where he was assistant superintendent of the Meter and Service Department. With a background of more than 20 years in meter and service work, Mr. Hetzler will direct product development and engineering research as well as handle general sale and distributor problems.

Owen W. Hetzler

The election of **Roy T. Hurley** and **Richard K. Paynter, Jr.,** as directors has been announced by J. R. MacDonald, chairman of the board and president of **General Cable Corp.**

Mr. Paynter is executive vicepresident of New York Life Insurance Co., and Mr. Hurley is chairman and president of Curtiss-Wright Corp.

Ideal Industries, Inc., has announced the appointment of **Clifford J. Boehmer** to the position of Product Development Manager, with headquarters at the company factory in Sycamore, Ill. Mr. Boehmer was formerly Atlanta district manager. He has been connected with Ideal Industries for over 15 years, spending seven years in the plant and over eight years out in the field. Mr. Boehmer was with the Chicago Office and Milwaukee Office before being transferred to Atlanta.

During a period of personnel reorganization in the Atlanta Office, **Harry Mathis,** an assistant to Mr. Boehmer, will act as District Manager.

Clyde E. Mims, P. O. Box 2692, Myrtle Beach, S. C., has been appointed sales representative for North and South Carolina by **Arlington Industries, Inc.,** manufacturers of fittings.

Leo Roach, 5010 New Kent Rd., Richmond 25, Va., has been appointed to represent Arlington in the state of Virginia.

Bertrand J. Farrell has been named sales manager of the Wholesale Division of **Jefferson Electric Company** by E. M. Nesvig, general sales manager.

Prior to joining Jefferson, Mr. Farrell was sales manager of the Redmond Company.

Announcement has just been made by Ralph Pryne, president, **Pryne & Company, Inc.,** developer and manufacturer of home exhaust ventilating fans and recessed lighting fixtures, of the election of **Richard V. Burns** as vice-president in charge of manufacturing.

In his new post, Mr. Burns will report directly to E. F. Kelly, the company's executive vice-president. He will be responsible for manufacturing operations at both Pryne's Pomona, Calif., and Keyser, W. Va., factories.

Richard V. Burns

Mr. Burns, who is 38 years old, joined Pryne & Company in May, 1937. Except for three years spent in the South Pacific with the Advance Warning Radar Unit of the U. S. Army Signal Corps., he has been with the company since that time. Starting with Pryne's West Coast plant as a bench mechanic, Mr. Burns has come up through the ranks as lead man, foreman, departmental supervisor, and director of Manufacturing, to reach his present position.

Anderson Electric Corp., Birmingham, Ala., manufacturers of bronze and aluminum connectors, clamps, fittings, and accessories for the electrical power industry, announces the appointment of **Kenneth A. Fleck** as engineering manager.

R. E. Schuler, president of the company, stated, "Mr. Fleck's appointment culminates an extensive search

Kenneth A. Fleck

for the right man to head our engineering department. We consider Mr. Fleck one of the finest men in his field, and feel confident his contribution to Anderson and to our customers, will be of great value."

Mr. Fleck was formerly connected with Moloney Electric Company of St. Louis. He attended Washington University School of Engineering, St. Louis, and Iowa State University, Ames, Iowa.

Ray N. Leach has been elected president of **Jasper Blackburn Corp.**, St. Louis manufacturers of electrical products. The announcement was made by the Blackburn board of directors.

Mr. Leach joined the company in 1932, becoming sales manager in

Ray N. Leach

1936, vice-president in 1939 and executive vice-president in 1953. He succeeds **Mrs. Francis B. Weaver** of Ft. Lauderdale, Florida, as president and is the first person outside the Blackburn family to head any of the Blackburn enterprises which date back to 1905.

KILLARK FITTINGS

offer you

3-WAY STRENGTH

on every job!

1 Strength in METAL

Non-rusting aluminum plus a special blending of alloys for greater malleability and resistance to shock and strain far beyond on-the-job needs.

2 Strength in DESIGN

Carefully engineered for maximum performance, designed to utilize inherent metal-strength to the fullest.

3 Strength in MANUFACTURE

Die-cast under 10,000 lbs. of pressure to produce a tougher, closer-grained metal.

GET IN TOUCH WITH THE KILLARK DISTRIBUTOR SOON

ATLANTA, 69 Mills St., N. W.
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BALTIMORE, 11 W. 25th St.

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ELECTRIC MANUFACTURING COMPANY
3940 EASTON • ST. LOUIS 13, MO.

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IS
YOUR
INVITATION
Southeastern Electrical
Wholesalers Association, Inc.
P. O. Box 176—Ben Hill Station
Atlanta 11, Georgia
All Branches Of The Electrical
Industry Are Invited To Come South
For SEWA's Seventh
"Industry Day" Meeting At
The Biltmore Hotel-Atlanta, Ga.
"Where All May Find A Common
Meeting Ground and Sounding-Board"
Meet Your Friends and
Competitors
January 23-24-25, 1957

Better installations in less time

Simple, quick to install

BLACKHAWK 540 BOX SUPPORT

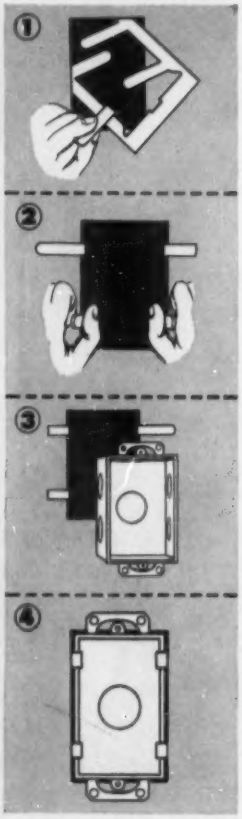
stays rigidly in place

The Blackhawk No. 540 one piece box support slips into the wall opening and tabs are bent back to hold it in place. After the switch box is installed, the tabs are bent to the inside of the box squeezing it firmly in place. It's that simple and quick.

It makes a permanent installation because the Blackhawk 540 box support is a large single piece . . providing rigid, unified support. It does not wiggle or saw because it is paralliel to the wall.

For simple, quick, permanent switch box installation, specify Blackhawk No. 540 box support. Ask your electrical distributor for Blackhawk.

Blackhawk Industries
BLACKHAWK INDUSTRIES
DUBUQUE, IOWA



Free bulletins

A new, revised catalog folder on **mercury fluorescent lighting fixtures** has been made available by **Smithcraft Lighting Division,** Chelsea 50, Mass. This useful folder contains complete specifications, photometric data, and other details of the popular, economical Smithcraft mercury fixture.

The Smithcraft mercury is an all-steel, louvered fixture designed for schools, stores, and similar installations. It may be mounted either surface or pendant, individually or in continuous rows. Matching spot boxes are available for accent lighting. Two-, three- and four-lamp units in Rapid-Start and Slimline models with lengths from 48" to 96", offer a wide range of selection to fit any job.

For additional data, ask for item B-1243, using the coupon on page 61.

A new 4-page 2½ x 11 illustrated two color catalog (Bulletin 7514) describing the new Model CA Ventura **attic fans** for residential "comfort cooling" is now available from **American Blower Corp.,** Detroit 32, Mich.

This bulletin describes the new fan design and outlines the advantages of "comfort cooling." Easy-to-follow drawings of the flow diagram type describe two typical installations. One shows the Ventura fan installed on an outside wall; the other illustrates an installation in the center of the attic.

For additional data, ask for item B-1244, using the coupon on page 61.

New **Auto-Switch equipment** with 50-kvar capacitors is described in a four-page bulletin available from **General Electric Co.,** Schenectady 5, N. Y. This equipment consists of pole-type racked capacitors with type NR remote control oil switches rated 14.4 kv, 200 amperes.

The bulletin is designated GEA-6485. Drawings, charts, pictures and diagrams point out design features of the new equipment.

Less bending moment, less weight, smaller size and lower price per kilovar are some of the advantages of the new mechanism, according to General Electric engineers.

For additional data, ask for item B-1245, using the coupon on page 61.

The Modern Way to Provide Convenience Outlets Unlimited is the title of **The Wiremold Company's** new circular on its complete line of Plugmold systems. The circular illustrates and describes the five sizes of Plugmold raceways 3000, 2200, 2100,

from faulty power equipment, we

2000, and 1900, with capacities up to 10 No. 6 conductors.

Prepared for electrical contractors, maintenance people, architects, engineers, and builders, it shows, through its many carefully executed sketches, that there is a Plugmold system for every outlet needed in heavy and light industry, stores, offices, and homes.

A copy may be secured by writing to the company, Hartford 10, Conn. Ask for Form 589.

For additional data, ask for item B-1246, using the coupon on page 61.

Electrical and physical properties of **flexible copper braid** pertinent to efficient use of this type of electrical connector are reported in the latest Technical News Letter published by the **Burndy Engineering Co., Inc.**, Norwalk, Conn.

Illustrated by curves, tables, diagrams, and photographs, the report is an up-to-date summary of findings by Burndy engineers who have been testing flexible braid under varied operating conditions.

For additional data, ask for item B-1247, using the coupon on page 61.

●

Practical tool control

(Continued from page 25)

jobs require only $300 to $400 worth of tools.

Depreciation system

We depreciate the majority of our tools over a three or four year period. More expensive items may be depreciated from five years on up, depending on the tool's value and estimated life. For example, we depreciate items like small electric drills, ladders, hickies, fish tapes, oil cans, small pipe benches and ½″ to 2″ stocks and dies in three years. Larger tools like hydraulic benders, power saws, large pipe-threading machines, large electric hammers, and welders are charged-off over a five-year period.

Some items may be charged-off sooner than three years. For example, if you use a ladder on a job for a year or more, in most cases, it can be fully depreciated during that time.

The proper use of tools is important to ensure long life; consequently, we place a good deal of emphasis on tool care and use during our apprenticeship training program. Safety is, also, highlighted during these sessions. This is particularly true with regard to the use of power tools.

To further protect our crews

ONLY ELECTROMODE Offers so much! in Automatic ELECTRIC HEAT

ALL YOUR REQUIREMENTS FROM ONE RELIABLE SOURCE
COMPLETE OR SUPPLEMENTARY HEAT

FOR HOME . . . . . .
- ✓ BASEBOARD HEATERS — *Low-Level Perimeter Heat*
- ✓ WALL-TYPE AND PORTABLE — *Fan-Circulating Models*
- ✓ PANEL HEATERS — *Radiant Convection*
- ✓ RADIANT CABLE HEAT

WALL MODEL For bathroom or small room.

FOR INDUSTRY . . . . . .
- ✓ SUSPENSION-TYPE
- ✓ PORTABLE AND SUSPENSION
- ✓ EXPLOSION-PROOF

SUSPENSION-TYPE Solves hard-to-heat areas in the plant and isolated locations.

ONLY ELECTROMODE has the SAFETY-GRID
a completely sealed-in CAST ALUMINUM HEATING ELEMENT. All electric wires are insulated and embedded within this finned aluminum casting. Absolutely no exposed hot wires or glowing coils, and no danger of fire, shock or burn. It's the greatest feature any electric heater ever had and it is guaranteed for five years.

Around The FARM . . .
- ✓ MILK HOUSE HEATERS
- ✓ PUMP HOUSE HEATERS

MILK HOUSE HEATER Also useful for brooder pens, fruit and vegetable bins, etc.

ELECTROMODE INSTALLATIONS BENEFIT CONTRACTOR AND USER
- Full Range of Designs and Sizes for every need.
- Automatic Room Temperature Control.
- Quality Line—Made by Experienced Manufacturer.
- No Call Backs—No Servicing—No Adjustments.
- Easy to Install—Saves Time and Labor.
- Profitable Line to Handle.

ELECTROMODE Division of COMMERCIAL CONTROLS CORPORATION

Dept. ES-126, 45 Crouch St., Rochester 3, N. Y.

Please send FREE Electric Heating File, containing specifications, illustrations, installations, prices and how to figure electric space heating. We are interested in:

☐ Home and Office Heaters ☐ Industrial Unit Heaters ☐ Farm Heaters

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City_____ Zone____ State_____

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FLOOR BOXES · WIRING SPECIALTIES

TOPS IN DESIGN

"Latrobe" Floor Boxes and Wiring Specialties are designed to do their job easily and surely with no excess parts. This same compactness of design makes for fast, easy installation.

Floor Boxes • Cover Plates • Pipe or Conduit Hangers • Gang Boxes • Nozzles • Fish Wire • Cable Supports • Junction Boxes • Insulator Supports • Staples and Cable Clips

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FULLMAN MANUFACTURING CO.
LATROBE . . . PENNSYLVANIA

• easily installed package
• adjustable capacity • non-overloading
• extremely quiet • high in efficiency
• duct mounted or free air delivery
• 1001 commercial ventilation uses
• "Q" Factor* assurance of satisfaction

. . . a few of the reasons why

"BUFFALO" BELTED VENT SETS

are so widely used.

For efficient low-cost ventilation between 500 cfm and 20,000 cfm (Direct drive Baby Vent Sets for smaller capacities) for easy installation indoors or outdoors — for fans of time-proved performance — you can make no better choice than "Buffalo" Belted Vent Sets. Write for Bulletin 3720 and see why!

**The "Q" Factor — the built-in Quality which provides trouble-free satisfaction and long life.*

"Buffalo"

BUFFALO FORGE COMPANY
BUFFALO, NEW YORK
Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

INDUSTRIAL EXHAUSTERS BELTED VENT SETS PROPELLER FANS "E" BLOWERS-EXHAUSTERS

from faulty power equipment, we check regularly to see that all electrical tools' ground connection cables are in good repair. If anything happens to this equipment on the job, making it defective, this must be reported to the stock-keeper.

A firm must be concerned about its tool investment if it is going to protect it. Tool costs should be included as part of job costs, and depreciation must be allowed-for in overhead. Some firms, in order to be competitive on bids, actually leave tool costs and depreciation out of the picture entirely. These firms are fooling none but themselves.

●

Tool storage system

(Continued from page 23)

Mr. Lewis said, "We don't find it very practical to maintain a special maintenance department of our own on these tools. We usually buy each vitally important tool in pairs or even greater numbers. When a hydraulic punch, for example, goes haywire we send it back to the factory for repair and put another one to work in its place. We have to tie up more money in our tool inventory by keeping standby duplicates ready, but it is cheaper than trying to operate our own repair department. Then again, the repair time at the factory is short and it isn't long before we get the rehabilitated tool back. The time lost is rarely ever costly.

"New men are instructed in the use of the more complicated tools by being sent out with experienced users on regular jobs."

Travis Electric Company is composed of three Travis brothers, Hilliard, Wade and Leon; two other partners, J. L. Webb, who is a vice-president; and S. L. Lewis, who is superintendent of work operations and also a vice-president.

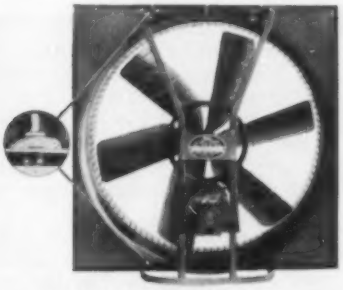
●

Know the law

(Continued from page 36)

what labor and materials are covered by the figures. Usually, that would seem to mean identity of labor and materials with the labor and materials called for by the plans and specifications of the general contract.

Obviously, the electrical con-



- *Easier to Install*
- *New Quiet Operation*
- *Competitive Prices*

COOLAIR Ventilating Fans

For quiet, general purpose ventilation at lowest cost, you can't beat the Coolair type CQ shown here. It's ideal for schools, auditoriums, and stores . . . wherever a quiet fan is needed.

Exclusive rubber vibration insulators, as shown in the insert photo, are built into the fan frame. You can meet specifications for resilient-mounted, wall-type fans with far less installation trouble and cost. No bother with mounting fan on rubber or felt.

Proof that Coolair prices are competitive—Coolair fans were used on all four U. S. 3rd Army barracks rehabilitation projects started in the summer of 1955.

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AMERICAN COOLAIR CORPORATION
3608 Mayflower Street
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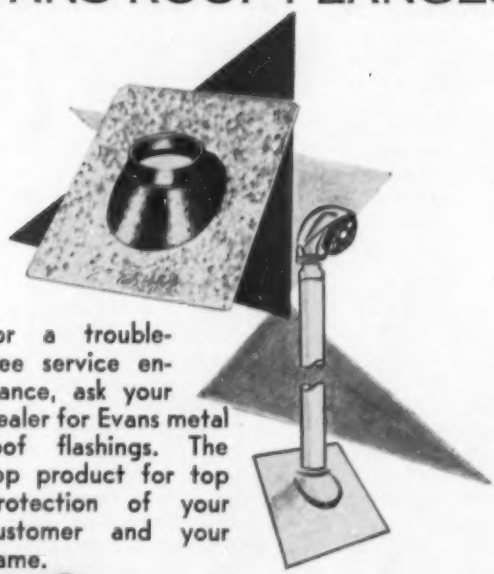
another top product
EVANS ROOF FLANGES

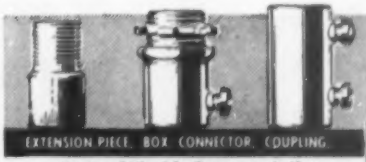


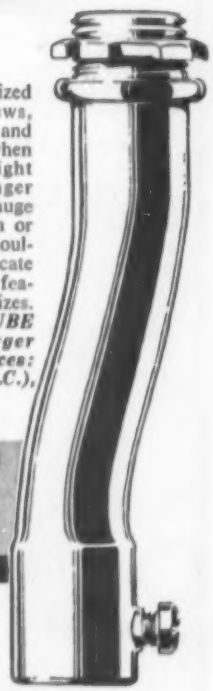
For a trouble-free service entrance, ask your dealer for Evans metal roof flashings. The top product for top protection of your customer and your name.

Evans Metal Co.
P. O. BOX 97—NORTHSIDE STATION
ATLANTA, GEORGIA

ALL TUBE-WELD FITTINGS' SCREWS ARE STAKED FOR PERMANENCE!

With Tube-weld's oversized hardened steel set screws, you'll eliminate fumbling and costly waste of time when working in high or tight places. This, plus longer length for easy wire-pulling, heavy gauge *one piece* construction that cannot open or spread, self-centering box connector shoulders, lustrous zinc finish and easy-to-locate packaging are just *some* of Tube-weld's features. Available in ½", ¾" and 1" sizes. Brochure on request. ***ELECTRIC TUBE PRODUCTS, (A Subsidiary of Berger Machine Products, Inc.) Plant & Offices: 74-16 Grand Avenue, Maspeth (N.Y.C.), N.Y., DEfender 5-8000.***





State of Florida Representative

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4002 N. W. 2nd Avenue
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YOU WOULDN'T BUY
A HAT THAT'S TOO BIG!

SO WHY BUY A CONTROL THAT'S THE WRONG SIZE?

FURNAS
MAGNETIC CONTROLS
GIVE YOU
CORRECT CAPACITY
FOR THE JOB!

The many in-between sizes in the Furnas Electric starter line let you select the motor control that is best suited for your particular requirements—with no wasted capacity and expense. Match the starter to the job and save up to 25%. For proof, compare the 9 sizes of the Furnas Electric starter line with the 5 sizes normally offered. And you can save up to 40% in space by using the correct size starter.

For more information write for Bulletin 5530—1064 McKee Street, Batavia, Ill.

A11

FURNAS ELECTRIC COMPANY
BATAVIA, ILLINOIS
Sales Representatives in all principal cities

tractor will not be in good position to claim right to award of a subcontract at the figures furnished by him unless it be to furnish the same labor and materials as the general contractor is bound to furnish under his contract.

It is to be understood that the writer does not suggest that the precise wording above quoted be used in written agreements. The wording is mentioned only to show that such agreements can be simply worded and that the principal thing to be borne in mind is the need for clearly showing just what, if any, advantages the electrical contractor is to receive in exchange for furnishing figures used by the general contractor in successful bidding.

Where considerable sums of money are involved, the writer advises that the electrical contractor have the assistance of capable local legal assistance in phrasing written agreements, particularly, when the circumstances call for stating conditions not involved in previous agreements.

●

FAEC convention

(Continued from page 35)

This was followed by the election of FAEC officers for 1957: president, James Dandelake; first vice-president, R. H. Palmer, Jr.; second vice-president, J. Arthur Turner, Sr.; and secretary-treasurer, Hilary B. Garvin.

After lunch T. E. Johnson, assistant to the vice-president of Florida Power & Light Company, came up with his pleasant "Predictions for Electrical Florida in 1957". His revelations were beyond the belief of many, but, as they are based on facts and findings of this country's business leaders, they are obviously sound. The keynote of his address was: "1957 will be a big year in Florida. . .a big year in construction. All this means more business for the electrical contractor. Now is his time to get more profits!"

The annual banquet started at 8 p.m. After the invocation, pretty Miss Latrisia Kinney (Miss Miami) was fittingly crowned Miss High Voltage of 1956 by President Palmer and his court of FAEC Officers.

Next followed the awarding of a long line of fishing and golf tournament prizes, as well as the coveted attendance prizes. The latter winners names were selected by Miss High Voltage from the "Prize Cylinder" which held the punched tickets of all who visited every electrical exhibit.

Officers for 1957 were installed, concluding with lovely, practical memory gifts to the outgoing president and secretary-treasurer and their wives.

So concluded another business year for Florida electrical contractors . . . and the beginning of a New Year for President Jim Dandelake, who said: "May the members who couldn't attend the 1956 Convention take full advantage of the business opportunities of 1957 to make money. . .and come to the next convention and electrical show".

●

Selection and maintenance

(Continued from page 21)

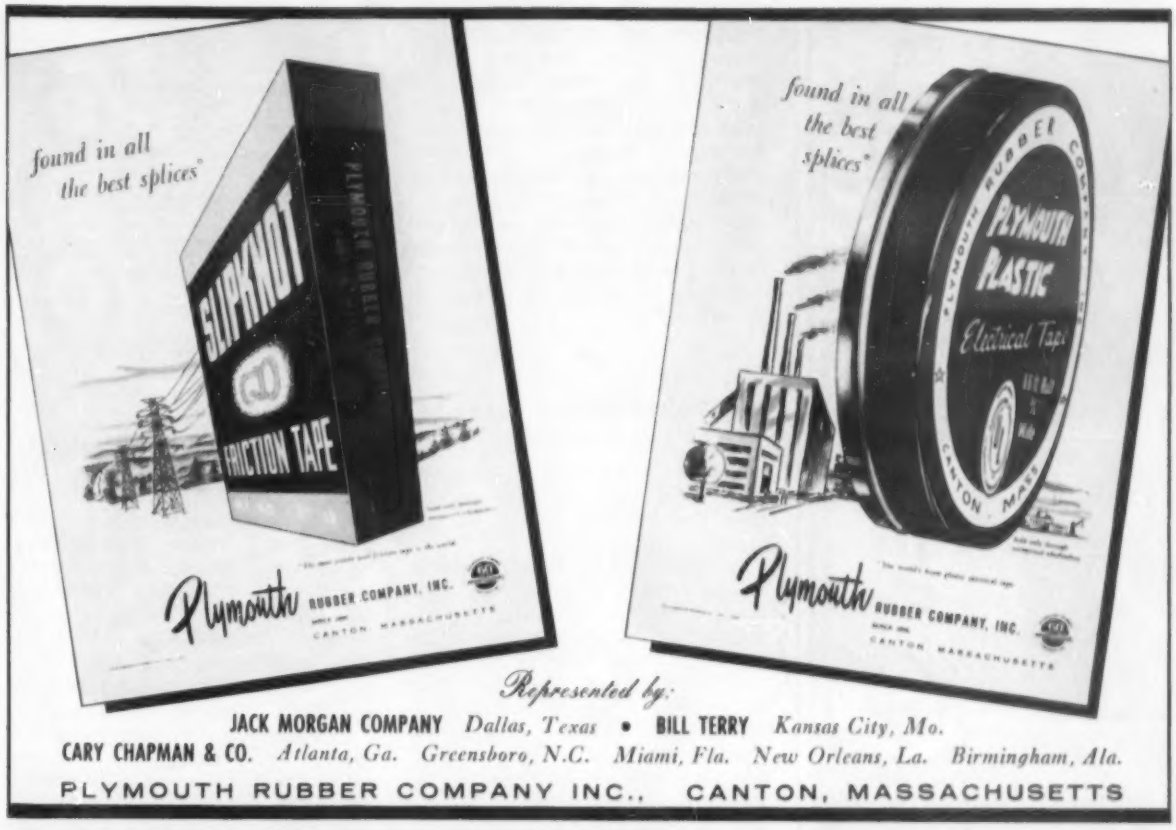
the use and ingenuity supplied by the users. However, they are of no use to anybody if not well maintained, and supplied in sufficient quantity to serve the purpose. Regardless of how well the maintenance program for your tools is set up, or how fool-proof your system may be, your tools should be watched over and cared for by a capable, experienced person.

Tool and equipment maintenance is a rigid must, if labor and time-saving features are to be preserved. When Power Electric closes out a job, all equipment is sent to our Jackson, Miss., shop for cleaning and possible repair. Dies, punches, saws, in fact all cutting edges are replaced; hydraulic cylinders are checked for leaks; trucks are serviced; everything is put into perfect shape for the next job.

Each Power Electric job superintendent understands the necessity of starting a new job with all power equipment in first-class working order. His comments and suggestions about the use of any reasonable labor-saving equipment and its maintenance is invited by the management.

We feel that another important factor in providing well maintained power equipment is the effect on job personnel. A good journeyman electrician prefers to work for a firm who provides good tools that will help him do a better job.

With over a $25,000 tool inventory scattered over several states at the present time, in order to equip an average force of 150 elec-



Represented by:

JACK MORGAN COMPANY *Dallas, Texas* • **BILL TERRY** *Kansas City, Mo.*

CARY CHAPMAN & CO. *Atlanta, Ga. Greensboro, N.C. Miami, Fla. New Orleans, La. Birmingham, Ala.*

PLYMOUTH RUBBER COMPANY INC., CANTON, MASSACHUSETTS

CERTIFIED 45° x 45° SHIELDING FOR SCHOOL LIGHTING

HIGH IN EFFICIENCY 80.5%
HIGHER IN REFLECTANCE 0.93%
HIGHEST IN QUALITY
45296 - 430
Fluorescent by Southern
Here is a fixture not only pleasing to the eye with a 45° x 45° shielding angle, but it has all the qualities of SOUTHERN'S best in design and construction. Can be wired with regular, rapid start, and slimline ballasts. These 2 lite, 4 and 8 foot fixtures are constructed of heavy guage cold rolled steel, designed for either surface (ceiling) or suspension (stem) mounting. The modern designed louvers are securely attached to the "V" type reflector forming one unit, and may be lowered from either side without the use of tools. This SCHOOLITE fixture may be joined in continuous rows without additional parts.
Remember, specify and satisfy with SOUTHERN fluorescent fixtures.

SOUTHERN LIGHTING MFG. CO.
503 ELWELL ST. — ORLANDO, FLORIDA

12 - 56

tricians, we are pretty careful about knowing where the power tools are at all times.

Before tools are sent to a construction job in one of our trucks, a record form at the plant is made out showing what tools are going where. When the tools are returned to the plant, they are checked off the list, and entered on the tool room list.

On the job it is the responsibility of the foreman to see that tools are not scattered and are locked in the gang box every night. If a foreman's tool list checks short very often, it indicates that he is not the type of man we want to work for us. Of course, some tools are expendable such as small drills, small cutting tools and step ladders, and are so charged off to the job as such. However, the larger power tools are depreciated normally as set up by our audit department.

●

UG capacitors

(Continued from page 54)

able basis of the analysis, no board study was made to make certain that the increase could be obtained in practice.

(7) Best results from available funds. Finally, if all of the costs implied by the foregoing are assigned to a network capacitor installation, there will be no financial justification for their use. Most of the articles which have come to the author's attention wind up by showing a slightly lower annual cost per kw of network capacity by using capacitors. Many of the articles show about a "break-even" saving. This in itself should be a warning sign that the wide-spread use of them is doubtful. If, however, we choose to consider a "break-even" or slight saving as enough to justify their use, there is one more consideration on which we should stop and reflect. And that is - - "Can I secure a greater return on my investment in other ways?"

Personally, the author can think of a number of ways in which available funds could be spent which will show a positive saving rather than to dump the money into the underground system and "break-even." For instance, nowhere will you find a 2/0 copper circuit in a 115 kv transmission line carrying a peak load of 300 amperes or 60,000 kva. Yet, in many 4 kv distribution systems will you find a 2/0 copper conductor carrying this same 300 amperes or 2080 kva. Herein lies one opportunity to get more for our money than can be realized from the installation of capacitors.

The tops of our engineering and design departments hold frequent meetings to make certain that the most economical generating and transmission systems are provided but seem to lose a lot of their interest where distribution is concerned. This is but one illustration of an attitude that makes today's distribution system far less efficient than the generating or transmission systems.

All of this merely means that we, as distribution engineers and operators, must work harder than the other groups to see that such money as is available is spent to produce the maximum return. And because our systems now fall so far short of perfection, there are many places where we can profit-

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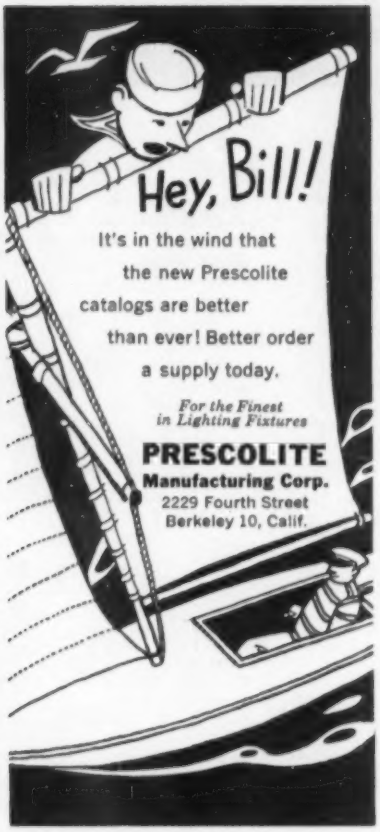

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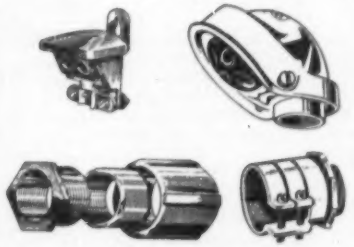

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ably spend the money for general improvements. We don't have to resort to "break-even" projects to keep busy. And, specifically, this means that we should not lean over backwards with this business of network capacitors and install them just because they show a slight saving after being given all the breaks in our analysis. There are too many places where we can show a greater return and we are not doing our job if we don't find those places.

●

Maintenance contracts

(Continued from page 19)

nance contract is not too difficult to sell if you emphasize the following points:

(1) We did the building for the customer; consequently, we know the system thoroughly. We know where the feeders come from and where they go. We know their capacity and will never overload them. Because we are familiar with the circuits, our crews can give fast, efficient service thus reducing lost time to minimum. The customer does not have to pay us to learn the system.

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(3) We point out that an outsider trying to service the system might cost the customer money because of errors he might make.

(4) We emphasize that we want to please the customer, and that every call he makes to us will be handled with dispatch and courtesy. Today, customers have more money available than at any time in the history of this area. Prompt and efficient service will sell to large customers before price will."

In conclusion, Mr. Puckett pointed out, "If a contractor wants to wrap up a maintenance contract with a customer, he had better be certain that the original installation is performed with good feeling all around. If the customer is happy with the work and with his relations with the contractor, the chances of getting a maintenance contract are practically assured. If the relations are not good, then, the contractor can kiss the maintenance contract good-bye."

●

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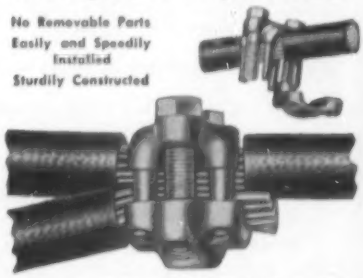

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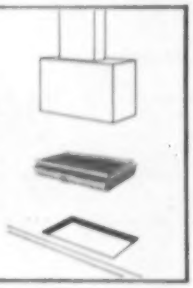

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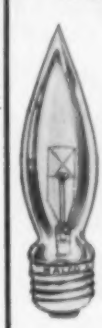

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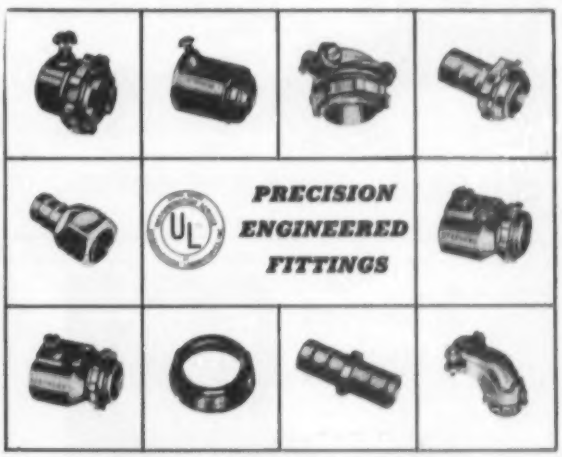

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